

# RING OUZEL REPORT 2016



## **FINDINGS OF A STUDY OF RING OUZEL *Turdus torquatus* TERRITORIES IN ROSEDALE AND OTHER AREAS OF THE NORTH YORK MOORS**

**Summary of 2016 Report on Page 3**

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**Front-page photo:** Sheriff's Pit, Rosedale, male taking food to nest in disused pit shaft on 24<sup>th</sup> June 2016. Vic Fairbrother.

## **1. SUMMARY OF 2016 RING OUZEL REPORT**

- 1. First-arrival at Nab Scar on 24<sup>th</sup> March - same place and two days later than 2015 (5.2, Pg. 16)**
  - 2. 13 territories recorded in 2016 - down from 17 in 2015 and peak of 23 in 2012 (5.3, Pg. 17)**
  - 3. Three early nests found predated, two at egg stage, one at chick stage (5.4, Pg. 24)**
  - 4. Nest productivity below long-term average in 4 of the last 5 years (5.4, Pg.24)**
  - 5. Pairs having a late nest slightly below the long-term average (5.5, Pg. 26)**
  - 6. 70% of all Rosedale nests lie in a narrow 50 metre altitudinal band (5.7, Pg. 28)**
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## 2. INTRODUCTION

The 2016 survey was the 17<sup>th</sup> year in which a detailed study had been made of the Ring Ouzel *Turdus torquatus* (RZ) population in the North York Moors National Park. The findings of these studies were submitted to various bodies including the North York Moors National Park Authority, the RSPB Ring Ouzel Study Group, Natural England (York office) and the land-owners and head keepers of Spaunton and Rosedale estates.

The 2016 season marked 15 years of unbroken study in the Rosedale area, only the foot and mouth outbreak in 2001 and the subsequent closure of the moors prevented continuous study since the start of the project in 1999. As in previous years the 2016 survey concentrated mainly on the Rosedale area of the North York Moors, an area of around 25 square kilometres. As in previous years, visits were made during late summer to locate Ring Ouzels prior to migration.

Finally, the north-west and east side of Rosedale was covered by Vic Fairbrother and the west side by Ken Hutchinson.

### 3. METHODOLOGY

#### 3.1 Breeding Status Criteria

The criteria used to determine the existence of a territory is shown in the table below using the categories defined by the British Trust for Ornithology (BTO) for determining breeding evidence.

BREEDING STATUS	CRITERIA
<b>Possible</b>	<ul style="list-style-type: none"><li>• Single bird observed in suitable nesting habitat.</li><li>• Male seen or heard singing on one survey date only.</li></ul>
<b>Probable</b>	<ul style="list-style-type: none"><li>• Male observed singing on two different days in a week or more at the same place.</li><li>• Territorial behaviour observed on two or more days.</li><li>• Pair observed in suitable nesting habitat.</li><li>• Nest-building activity.</li><li>• Agitated behaviour.</li></ul>
<b>Confirmed</b>	<ul style="list-style-type: none"><li>• Nest found with eggs or chicks.</li><li>• Recently fledged young seen.</li><li>• Adult seen carrying food.</li></ul>

#### 3.2 Fledging Criteria

An assessment of whether a brood fledged successfully is made using the ‘outcome success’ criteria of the BTO Nest Record Scheme as appropriate.

- Young fledged nest on approach.
- Fledged young near nest.
- Adult carrying food to fledged young near nest.
- Adult visibly agitated/alarming as if fledged young are near nest.
- Nest empty and undisturbed with well-trodden lining, containing feather scale and/or droppings.
- Young capable of leaving nest on penultimate visit.

Ring Ouzel chicks remain relatively settled when in the nest but can ‘explode’ from the nest when approached close to fledging. For that reason, nests are not generally inspected the day before the estimated fledging date in order to avoid this premature fledging.

In view of this and unless there is evidence to the contrary, such as obvious signs of predation, all nestlings present on the penultimate visit are considered to have fledged if the nest is empty on the later final visit.

The discovery of small groups of droppings in sheltered locations in the vicinity of the nest has also been noted as supporting evidence that fledglings have been hidden there for a time after leaving the nest.

#### 3.3 Definition of Study Area

References in this report to the **Rosedale area** include the main dale (valley) of Rosedale and adjoining Spaunton Moor (Loskey Ridge, Loskey Side, Spaunton Knowl, Spindle Thorn). References to **Rosedale** refer only to the main dale of Rosedale.

## 4. RESULTS

### 4.1 Territories

#### 4.1.1 Rosedale Area

Table 1: Breeding Ring Ouzel territories in the Rosedale area between 1999 and 2016

	Location (all territories recorded to date)	NGR	Year																
			99	00	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
1.	Spaunton Moor - Spindle Thorn	SE 716 930	?	*	✓	*	*	*	*	*	✓	*	*	?	✓	✓	✓	✓	✓
2.	Spaunton Moor - Spaunton Knowl	SE 717 918	?	?	?	?	?	?	?	?	?	?	?	?	✓	*	*	*	*
3.	Spaunton Moor - Loskey Side	SE 708 933	?	?	?	?	?	?	?	?	?	?	?	?	*	✓	*	*	*
4.	Spaunton Moor - Loskey Ridge west	SE 714 934	?	✓	✓	✓	*	*	✓	*	*	*	*	?	*	*	*	*	*
5.	Spaunton Moor - Loskey Ridge east	SE 715 935	?	*	*	✓	✓	✓	*	*	*	*	*	?	*	*	*	*	*
6.	Rosedale west - Bank Top	SE 720 951	✓	✓	✓	✓	*	*	✓	*	*	*	*	✓	✓	✓	✓	✓	✓
7.	Rosedale west - Bank Top east	SE 725 945	?	*	*	✓	*	✓	*	*	*	*	*	*	*	*	*	✓	*
8.	Rosedale west - Hob Crag quarry area	SE 714 954	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9.	Rosedale west - Hob Crag north	SE 712 956	*	*	*	*	*	*	*	*	*	*	*	✓	*	✓	*	✓	*
10.	Rosedale west - Thorgill Bank quarry	SE 707 958	?	*	*	✓	*	*	✓	*	*	*	*	*	✓	✓	✓	✓	✓
11.	Rosedale west - Thorgill Bank west	SE 705 957	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓
12.	Rosedale west - Thorgill Head	SE 670 956	?	*	✓	✓	✓	✓	*	*	*	*	*	*	*	*	✓	*	*
13.	Rosedale west - Sheriff's Pit	SE 697 963	✓	✓	✓	*	✓	✓	✓	*	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.	Rosedale west - Sheriff's Pit (south)	SE 698 961	*	*	*	*	*	*	✓	*	*	*	*	*	*	*	*	*	*
15.	Rosedale west - Round Hill (south)	SE 694 968	?	*	✓	✓	✓	✓	✓	✓	✓	✓	*	*	✓	✓	✓	*	✓
16.	Rosedale west - Round Hill (west)	SE 693 971	*	*	✓	*	*	*	*	*	*	*	*	✓	✓	✓	✓	✓	✓
17.	Rosedale west - Round Hill (north)	SE 693 974	?	*	*	*	*	*	*	✓	*	*	*	*	*	*	*	*	*
18.	Rosedale west - Round Hill (east)	SE 694 970	?	*	✓	✓	✓	*	*	✓	✓	✓	✓	✓	*	✓	✓	✓	✓
19.	Rosedale west - Sledge Shoe Bents	SE 691 978	?	✓	✓	✓	✓	✓	✓	*	*	✓	*	✓	✓	✓	✓	✓	✓
20.	Rosedale west - Matty Carr quarry	SE 688 984	?	*	*	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	*	✓
21.	Rosedale west - Matty Carr (south)	SE 690 980	?	*	*	*	*	✓	*	✓	*	*	*	*	✓	*	*	✓	*
22.	Rosedale west - Lion Inn (north)	SE 680 999	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*
23.	Rosedale west - Lion Inn (south)	SE 681 999	*	✓	✓	✓	*	✓	*	✓	*	*	*	*	✓	✓	✓	✓	*
24.	Rosedale west - Blakey Swang	SE 685 998	?	?	?	?	?	?	?	?	✓	*	*	*	*	*	*	*	*
25.	Rosedale west - Dalehead (north)	NZ 680 013	✓	*	✓	*	✓	*	*	*	✓	*	✓	✓	✓	*	✓	*	*
26.	Rosedale west - Dalehead (west)	NZ 680 008	*	*	✓	✓	✓	✓	✓	✓	*	✓	*	✓	✓	✓	*	*	✓
27.	Rosedale east - Dalehead (east)	NZ 686 008	*	*	*	✓	✓	*	*	*	*	*	*	✓	*	*	*	*	*
28.	Rosedale west - Dalehead (south)	NZ 682 005	*	*	✓	*	*	*	*	*	*	*	*	*	*	*	*	*	*
29.	Rosedale east - Dalehead (quarryeast)	NZ 685 006	*	*	*	*	*	*	*	*	*	*	*	✓	*	*	*	*	✓
30.	Rosedale east - Dalehead (quarrywest)	NZ 683 008	*	*	*	*	*	*	*	*	*	*	*	✓	✓	✓	✓	*	✓
31.	Rosedale east - Reeking Gill (cutting)	NZ 689 007	*	*	*	*	*	*	*	✓	✓	*	✓	*	✓	✓	*	*	*
32.	Rosedale east - Reeking Gill (west)	NZ 690 007	*	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	*	*
33.	Rosedale east - Reeking Gill	NZ 691 007	✓	✓	✓	*	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
34.	Rosedale east - Reeking Gill quarry	NZ 692 005	*	*	*	*	*	*	*	*	*	*	*	*	*	✓	✓	*	*
35.	Rosedale east - Reeking Gill (south)	NZ 692 003	*	*	*	*	*	*	*	*	*	*	*	✓	✓	✓	✓	*	*
36.	Rosedale east - Nab Scar (north)	NZ 694 000	*	✓	*	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	*	✓	*
37.	Rosedale east - Nab Scar (south)	SE 695 999	*	*	*	*	*	*	*	*	*	*	✓	*	✓	*	✓	*	*
38.	Rosedale east - Sturdy Bank	NZ 699 000	✓	✓	✓	✓	*	*	*	*	✓	✓	✓	✓	✓	✓	✓	✓	*
39.	Rosedale east - East Mine	SE 705 989	?	?	?	?	?	?	?	?	✓	*	*	*	✓	*	*	*	*
<b>TOTAL</b>			<b>5</b>	<b>9</b>	<b>16</b>	<b>16</b>	<b>12</b>	<b>13</b>	<b>12</b>	<b>11</b>	<b>12</b>	<b>9</b>	<b>12</b>	<b>16</b>	<b>23</b>	<b>20</b>	<b>21</b>	<b>17</b>	<b>13</b>
1). Only a partial survey was carried out in 1999. 2). Foot & mouth prevented field work in 2001.																			
✓ = occupied by pair    * = not occupied    ? = not checked																			

#### 4.1.2 Other Areas of the North York Moors

The map at **Annex 2** shows the approximate location where Ring Ouzels were recorded on the North York Moors in 2016 - other than the Rosedale area and passage migrants.

#### 4.2 Nest Sites

Table 2: Summary of Ring Ouzel nest sites monitored in 2016.

No.	Location	Grid Ref.	Outcome	Comment
1.	Rosedale west - Round Hill east	SE69419681	Predated	1 <sup>st</sup> nest.
2.	Rosedale west - Thorgill Bank quarry	SE70749586	Fledged	1 <sup>st</sup> nest. Only 1 fledged from 4 eggs.
3.	Rosedale west - Sheriff's Pit	SE69739626	Fledged	1 <sup>st</sup> nest.
4.	Rosedale west - Sheriff's Pit	SE69739626	Fledged	2 <sup>nd</sup> nest.
5.	Rosedale west - Bank Top	SE71799497	Predated	1 <sup>st</sup> nest.
6.	Rosedale west - Matty Carr quarry	SE68809838	Predated	1 <sup>st</sup> nest.

Further details of Rosedale territories and nests can be found in sections: 4.5, 4.6, 5.3 and Annex 3 and 4.

### 4.3 Annual Breeding Results

Table 3: Summary of annual breeding results at Ring Ouzel nest sites in Rosedale and other areas of the North York Moors between 2000 and 2016. (Detailed results are presented at **Annex 3**)

Year	Nests Monitored	Successful nests	Laying pairs (2 <sup>nd</sup> clutch)	Pairs that hatched young (2 <sup>nd</sup> attempt) [2 <sup>nd</sup> brood]	Pairs that successful fledged young (2 <sup>nd</sup> attempt/brood)	Pairs that failed to fledge young	Total young fledged	Mean fledged young per successful nest <sup>a</sup> .	Mean fledged young per laying pair <sup>b</sup> .
1	2	3	4	5	6	7	8	9	10
00	1	1	1	1	1	0	4	4.00	4.00
02	1	1	1 (1)	1 (1)	1 (1)	0	4	4.00	4.00
03	7	3	6 (1)	4 [1]	3	3	11	3.66	1.83
04	4	2	4 (1)	4 (1)	2 (1)	2	8	4.00	2.00
05	6	4	4 (2)	4 (1)[1]	4 (2) <sup>c</sup>	0	13	3.25	3.25
06	3	1	2	1 (1)	1 (1) <sup>d</sup>	1	5	5.00	2.50
07	4	3	4	3	3	1	12	4.00	3.00
08	9	6	7(3)	7[2] <sup>e</sup>	5(1)	2	23	3.83	3.29
09	5	5	4(1)	4[1]	4(1)	0	19	3.80	4.75
10	12	9	8 (5)	7 [3]	7(2)	1	30	3.33	3.75
11	19	15	14 (8)	13 [8]	12 (5)	2	55	3.67	3.92
12	13	7	11 (5)	6 (1)[3]	6 (2)	5	23	3.28	2.09
13	16	13	10 (6)	9 (1) [6]	9 (5) <sup>f</sup>	1	40	3.08	4.00
14	20 <sup>g</sup>	11	15 (5)	12 (1)[3]	10 (2)	5	40	3.64	2.86
15	13	9 <sup>h</sup>	12 (3)	9 (2) [1]	8 (3)	4	27	3.00	2.25
16	6	9 <sup>h</sup>	9 (3)	9 [3]	8 (3)	1	23	2.56	2.55
<b>Overall Mean</b>								<b>3.63<sup>i</sup></b>	<b>3.13</b>

Note

<sup>a</sup>. Mean fledged young per successful nest (Column 9) = Column 8 ÷ Column 3

<sup>b</sup>. Mean fledged young per laying pair (Column 10) = Column 8 ÷ Column 4

<sup>c</sup>. A pair had two unsuccessful attempts before being successful at the third attempt.

<sup>d</sup>. A pair had one unsuccessful attempt before being successful at second attempt.

<sup>e</sup>. A pair had two unsuccessful attempts; 1<sup>st</sup> was predated at the chick stage, 2<sup>nd</sup> at the egg stage.

<sup>f</sup>. A pair had four nests; 1<sup>st</sup> was abandoned, 2<sup>nd</sup> was predated at egg stage, 3<sup>rd</sup> & 4<sup>th</sup> were successful.

<sup>g</sup>. The outcome of two nests located in Esklets is unknown as no final visit was made.

<sup>h</sup>. Includes nests that were not located but where recently fledged young were seen or where adults were seen feeding hidden young.

<sup>i</sup>. Mean: Glen Esk (Burfield) 3.48; Moorfoots (Burfield) 3.50; Yorkshire Dales (Appleyard) 3.60; BTO Nest Records (Flegg & Glue) 3.60.

#### Interpreting Table 3

- Column 2 shows the total number of nests found and monitored that year.
- Column 3 shows the number of nests fledging young (i.e. successfully leaving the nest) that year.
- Column 9 shows the average number of young fledged from each nest that year (see Note h. for comparison with other study areas).
- Column 10 shows the number of young fledged per pair averaged for all the pairs that laid eggs that year and includes those pairs that abandoned their eggs, lost nests to predation or had infertile eggs. **This is a measure of productivity.**

The nests of just six pairs were located and monitored in 2016, reflecting the lower number of breeding pairs. One pair at Sheriff's Pit had their first and second nests in the disused pit shaft, while a pair at Thorgill Bank quarry fledged just one chick from four eggs. Despite lengthy observations at Bank Top, Hob Crag, Thorgill West, Round Hill south and Sledge Shoe, no nests were found but adults were seen with young post-fledging. These observations, along with the six nests monitored, have been used to determine the annual productivity. The inclusion of these is likely to slightly underestimate the overall productivity figure as not all fledglings were seen, only those that were have been counted.



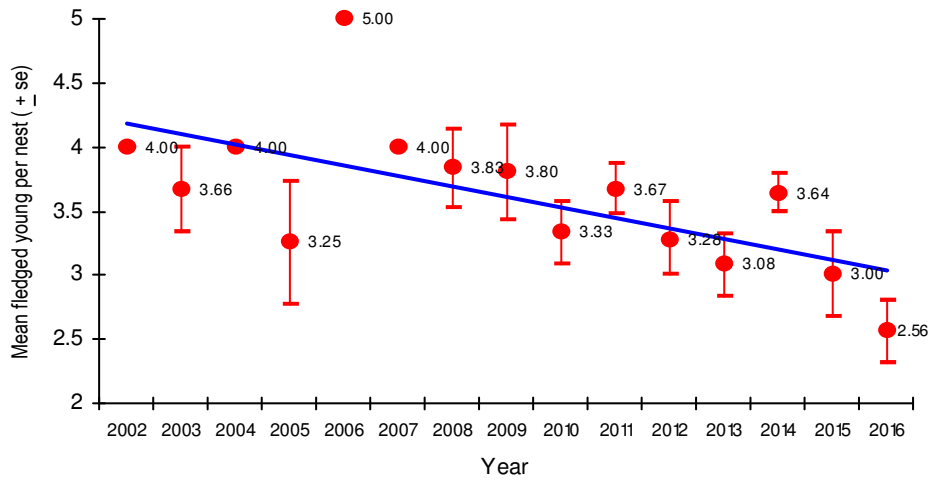


Figure 1: Annual mean fledged young per successful nest for Rosedale and other areas of the North York Moors between 2002 and 2016 showing 15-year trend.

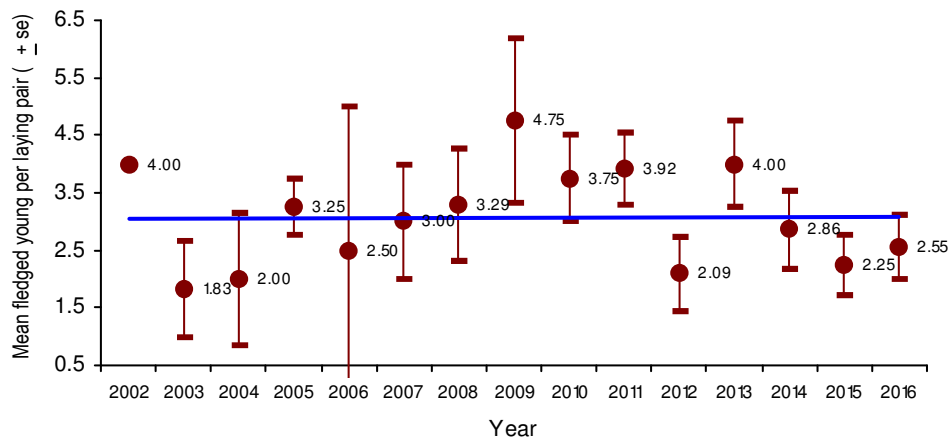


Figure 2: Annual mean fledged young per laying pair for Rosedale and other areas of the North York Moors between 2002 and 2016 showing 15-year trend.

#### 4.4 First-egg Laying Dates

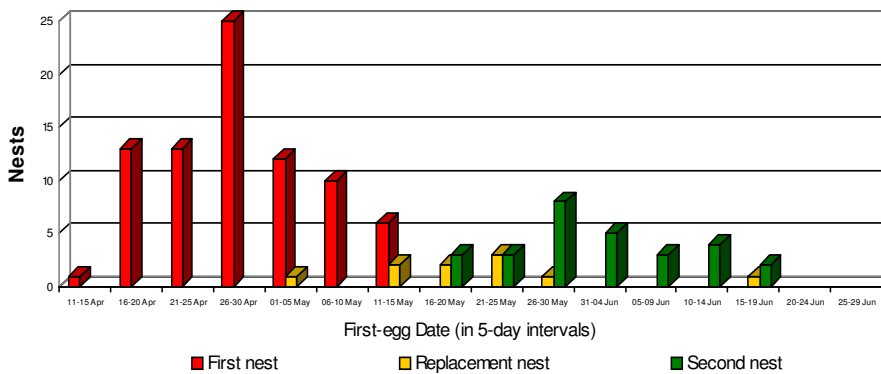


Figure 3: First-egg laying dates for Rosedale and other areas of the North York Moors between 2000 and 2016. Date points in 5-day intervals from April to June. (n=118)

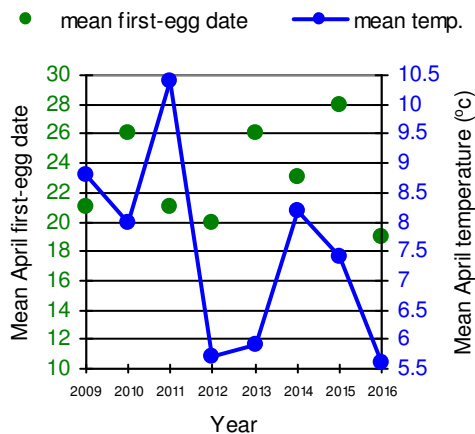


Figure 4: Mean April first-egg date and temperature for the North York Moors for the eight-year period from 2009 to 2016. (data from Fig. 6)

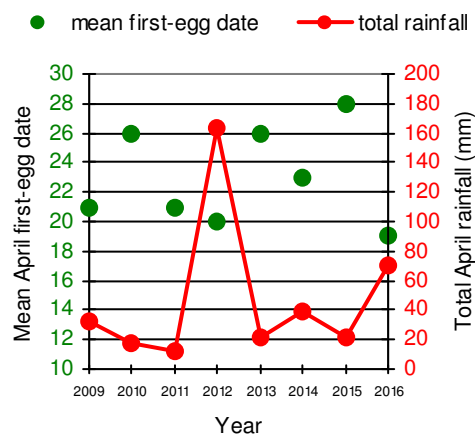


Figure 5: Mean April first-egg date and total April rainfall for the North York Moors for the eight-year period from 2009 to 2016. (data from Fig. 6)

From Figures 4 and 5 it can be seen that 2016 had one of the coldest and wettest ApriIs during the period 2009-16.

#### 4.5 First-egg, Hatching & Fledging Dates

Table 4: First-egg, hatching & fledging dates for Rosedale and other areas of the North York Moors.

Year	Nest location	1 <sup>st</sup> Egg	Hatching	Fledging	Comments
2000	Spaunton Moor	6 May (a)	21 May (a)	3 June	
2002	Bank Top	17 May	1 June	15 June	Replacement nest/eggs.
2004	Matty Carr Hill	26 April	11 May	25 May	
	Hob Crag	10 June (a)	26 June (p)	-	2 <sup>nd</sup> nest.
2006	Ousegill Bridge	10 May	25 May	7 June	
	Sheriff's Pit south	21 May	5 June	18 June	Replacement nest/eggs.
2007	Round Hill south	5 May (a)	20 May (a)	2 June (a)	
	Hob Crag	5 May (p)	-	-	
	Reeking Gill west	26 April	11 May	24 May	
	Dalehead west	29 April	14 May	27 May	
2008	Sturdy Bank 1 <sup>st</sup>	29 April	14 May (a)	27 May (a)	
	Sturdy Bank 2 <sup>nd</sup>	10 June	25 June (a)	9 July (a)	1 <sup>st</sup> egg 14 days after 1 <sup>st</sup> nest fledged.
	Round Hill south	1 May	16 May (a)	29 May	
	Reeking Gill	5 May	20 May (a)	2 June	
	West Gill	25 April	10 May	23 May	Seen copulating on 22 April.
	Hob Crag 1 <sup>st</sup>	28 April	13 May (p)	-	
	Hob Crag 2 <sup>nd</sup>	27 May (p)	-	-	Replacement nest/eggs.
	Sheriff's Pit	7 May	22 May	4 June	
	Dalehead north	25 May	9 June (a) (p)	-	Likely replacement nest/eggs.
2009	Reeking Gill	16 April	1 May	14 May	Pair arrived in gill on 25 March.
	Sturdy Bank	13 May (a)	29 May (a)	11 June (a)	Pair arrived in gill on 26 March.
	Round Hill south	26 April	11 May	24 May	1 <sup>st</sup> nest. 2 <sup>nd</sup> nest at Sheriff's Pit.
	Dalehead west	10 May	25 May	8 June	Likely to be 1 <sup>st</sup> nest.
	Sheriff's Pit	26 May	10 June	23 June (a)	2 <sup>nd</sup> nest. 1 <sup>st</sup> nest at Round Hill south.
2010	Sturdy Bank 1 <sup>st</sup>	30 April (a)	16 May (a)	29 May (a)	1 <sup>st</sup> nest.
	Sturdy Bank 2 <sup>nd</sup>	16 June (p)	-	-	Predated at egg stage.
	Reeking Gill	16 April	1 May	14 May (a)	1 <sup>st</sup> nest.
	Reeking Gill cut. 1 <sup>st</sup>	9 May	24 May (a)	6 June	1 <sup>st</sup> nest.
	Reeking Gill cut. 2 <sup>nd</sup>	11 June	26 June	7 July	2 <sup>nd</sup> nest. Likely fledged at 11 days.
	Ousegill 1 <sup>st</sup>	28 April	13 May (a)	26 May	1 <sup>st</sup> nest.
	Ousegill 2 <sup>nd</sup>	2 June	17 June (a)	-	2 <sup>nd</sup> nest. Failed at chick stage.
	Hob Crag 1 <sup>st</sup>	29 April	14 May	28 May (a)	1 <sup>st</sup> nest. Fledged at 14 days.
	Hob Crag 2 <sup>nd</sup>	9 June	24 June	7 July	2 <sup>nd</sup> nest
	Sheriff's Pit	13 May	28 May	10 June	Likely to be 1 <sup>st</sup> nest.
	Round Hill central	27 April	12 May	25 May	1 <sup>st</sup> nest.
	Dalehead quarry west	22 May	6 June	19 June	Likely to be 2 <sup>nd</sup> nest.

Year	Nest location	1 <sup>st</sup> Egg	Hatching	Fledging	Comments	
2011	Hob Crag	19 April	4 May	17 May	1 <sup>st</sup> nest. In nest on 16th ready to fledge.	
	Round Hill east	18 April	3 May	17 May	1 <sup>st</sup> nest. In nest on 16th ready to fledge.	
	Round Hill west	10 May	25 May	7 June	1 <sup>st</sup> nest. In nest on 6th ready to fledge.	
	Matty Carr	17 April	2 May (a)	16 May	1 <sup>st</sup> nest. In nest 14. Fledged & by nest 16.	
	Sturdy Bank 1 <sup>st</sup>	21 April	6 May (a)	19 May (a)	1 <sup>st</sup> nest.	
	Sturdy Bank 2 <sup>nd</sup>	28 May	12 June (a) (p)	-	2 <sup>nd</sup> nest. 3 hatched on 12th. Predated.	
	Nab Scar north 1 <sup>st</sup>	21 April	6/7 May (a)	20 May (a)	1 <sup>st</sup> nest. 2 eggs hatched on 6th & 2 on 7 <sup>th</sup>	
	Nab Scar north 2 <sup>nd</sup>	26 May	10 June	23 June (a)	2 <sup>nd</sup> nest. 3 pulli, 1 egg unhatched.	
	Reeking Gill 1 <sup>st</sup>	16 April	1 May	14 May (a)	1 <sup>st</sup> nest.	
	Reeking Gill 2 <sup>nd</sup>	19 May	3 June (a)	17 June (a)	2 <sup>nd</sup> nest. 3 eggs hatched on 3rd.	
	Ousegill	28 April (a) (p)	-	-	1 <sup>st</sup> nest. Likely predated at egg stage.	
	Dalehead west 1 <sup>st</sup>	23 April	8 May	21 May	1 <sup>st</sup> nest.	
	Dalehead west 2 <sup>nd</sup>	29 May	13 June	26 June	2 <sup>nd</sup> nest. In nest 24/6, out of nest 27 <sup>th</sup> .	
	Dalehead north	8 May	23 May	6 June (a)	1 <sup>st</sup> nest.	
	Dalehead quarry west 1 <sup>st</sup>	28 April	13 May	27 May (a)	1 <sup>st</sup> nest.	
	Dalehead quarry west 2 <sup>nd</sup>	?	(p)	-	2 <sup>nd</sup> nest. Predated at chick stage.	
	Dalehead east	25 May (a)	9 June	22 June	Likely to be 2 <sup>nd</sup> nest.	
	Thorgill Bank	18 May	2 June (a) (p)	-	Likely to be 2 <sup>nd</sup> nest. Predated.	
	Sheriff's Pit	30 May	15 June	27 June	Likely to be 2 <sup>nd</sup> nest.	
	2012	Reeking Gill cutting	17 April	2 May (a)	16 May (a)	1 <sup>st</sup> nest. 3 eggs hatched 2/5. 14 days to fledged.
Sturdy Bank		27 April (a)	-	-	1 <sup>st</sup> nest. Abandoned at egg stage.	
Nab Scar south		20 April (a)	5 May (a)	19 May (a)	1 <sup>st</sup> nest. 2 hatched 5 <sup>th</sup> . 14 days to fledged.	
Dalehead west		-	-	-	1 <sup>st</sup> nest. Abandoned at egg stage.	
Sheriff's Pit north		21 April	6 May	19 May (a)	1 <sup>st</sup> nest.	
Sheriff's Pit		28 May	12 June	25 June (a)	2 <sup>nd</sup> nest.	
Round Hill south		29 April	14 May (a)	(p)	1 <sup>st</sup> nest. Predated between Day 5 & 8.	
Reeking Gill		23 April	8 May (a)	22 May (a)	1 <sup>st</sup> nest. 14 days to fledging.	
Blakey Lion		10 May	25 May (a)	7/8 (a) June	1 <sup>st</sup> nest. 2 fledged 7/6 & 1 fledged 8/6.	
Matty Carr south		22 May	6 June	(p)	Likely 2 <sup>nd</sup> nest. Predated between Day 2 & 6.	
Matty Carr quarry		19 June	4 July	(p)	Likely replacement 2 <sup>nd</sup> nest from MC south pair. Predated at chick stage between Day 5 & 9.	
Round Hill west		20 May	4 June (a)	17 June	Likely 2 <sup>nd</sup> nest. One pulli died naturally in nest.	
Nab Scar north		?	-	-	2 <sup>nd</sup> nest. Predated at egg stage.	
Spaunton Knowl		22 April	8 May	(o)	1 <sup>st</sup> nest. 3 pulli. Outcome unknown.	
2013		Reeking Gill cutting	-	-	-	1 <sup>st</sup> nest. 4 eggs laid. Found abandoned 19/5.
		Sheriff's Pit 1.	25 April	10 May	24 May	1 <sup>st</sup> nest. 2 fledglings seen close to nest on 27/5.
		Sheriff's Pit 2.	3 June	19 June	1 July	2 <sup>nd</sup> nest. 3 possibly Day 6 stage on 24/6. 1 near nest 8/7.
	Reeking Gill 1.	27 April	12 May (a)	25 May	1 <sup>st</sup> nest. 3 hatched 12 <sup>th</sup> & 1 on 13 <sup>th</sup> . Likely fledged 25 <sup>th</sup> .	
	Reeking Gill 2.	28 May	12 June	24 June	2 <sup>nd</sup> nest. 2 pulli 21/6 9/10 days. Fledged 24/6 12/13 days. 1 egg unhatched.	
	Reeking Gill south 1.	2 May	17 May	30 May	1 <sup>st</sup> nest. 2 pulli at Day 6 on 22/5. 2 eggs unhatched.	
	Reeking Gill south 2.	5 June	20 June	3 July	2 <sup>nd</sup> nest. 4 pulli on 21/6 at Day 2 stage.	
	Hob Crag quarry 2.	25/26 April	-	-	2 <sup>nd</sup> nest. 1 <sup>st</sup> clutch, predated at egg stage.	
	Hob Crag quarry 3.	5 May	20 May (a)	2 June (a)	3 <sup>rd</sup> nest, 2 <sup>nd</sup> clutch. 3 hatched 20/5. 2 pulli in nest on 1/6.	
	Hob Crag quarry 4	12 June	25 June	7 July	4 <sup>th</sup> nest, 3 <sup>rd</sup> clutch. Day 3 27/6. Likely fledged at 12 days.	
	Dalehead west	28 April	13 May (a)	26 May	1 <sup>st</sup> nest. 1 hatched, 3 eggs on 13 <sup>th</sup> .	
	Round Hill west	14 May	29 May	11 June (a)	Likely late 1 <sup>st</sup> nest. 4 pulli fledged 11/6.	
	Round Hill south 1	2 May	17 May	31 May	1 <sup>st</sup> nest. Possibly 14 days to fledging.	
	Round Hill south 2.	16 June	1 July (a)	13 July (a)	2 <sup>nd</sup> nest. Fledged at 12 days. One dead left in nest.	
	Blakey Lion north	3 May	18 May	30 May	1 <sup>st</sup> Nest. Likely to have fledged at 12 days.	
	Sturdy Bank	2 May	17 May	30 May	1 <sup>st</sup> nest. Day old fledgling found in nest area on 31/5.	
	Blakey Lion south	12 May	27 June	9 June	Likely late 1 <sup>st</sup> nest. Day old fledgling found on 10/6.	
	Hob Crag north 1.	15 May	30 May	12 June	Likely late 1 <sup>st</sup> nest. Day old fledgling found on 13/6.	
Hob Crag north 2.	19 June	4 July (a)	-	Late 2 <sup>nd</sup> nest. 3 eggs on 27/6. Day 1 on 4/7. Predated.		
2014	Round Hill west	16 April	1 May	15 May	1 <sup>st</sup> nest. 4 eggs laid, 3 pulli seen at Day 11. Likely fledged 15/5.	
	Round Hill west	30 May	14 June	-	2 <sup>nd</sup> nest. 4 pulli seen at Day 6 on 19/6. Found predated on 23/6.	
	Round Hill east	27 April	12 May (a)	25 May	1 <sup>st</sup> nest. 4 eggs, 3 newly hatched & 1 egg on 12/5. All 4 fledged 25/5.	
	Blakey Lion south	27 April	12 May (a)	25 May	1 <sup>st</sup> nest. 4 eggs laid, 3 newly hatched & 1 egg on 12/5. All 4 fledged 25/5.	
	Hob Crag quarry	18 April	4 May	-	1 <sup>st</sup> nest. 4 pulli at Day 2 on 5/5. Found predated on 12/5.	
	Thorgill Bank quarry	19 April	5 May	-	1 <sup>st</sup> nest. 2 eggs 1 pullus just hatched 5/5. Found predated on 12/5.	
	Thorgill Head	14 May	29 May	-	Replacement nest. Sitting on 2/6. Found predated 5/6 at 3 days. 1 egg left.	
	Matty Carr quarry	1 May	16 May	28 May	1 <sup>st</sup> nest. 4 eggs. 4 pulli Day 4 19/5. 3 seen on 26/5. Likely fledged 12 days.	
	Sheriff's Pit	4 May	19 May	30 May	1 <sup>st</sup> nest. 4 eggs. 4 seen 29/5 11 days. Nest empty & 2 dead near nest 30/5.	
	Sheriff's Pit	8 June	23 June	06 July (a)	2 <sup>nd</sup> nest. 3 pulli seen in nest on 30/6 at Day 8.	
	Spindle Thorn	25 April	10 May	23 May (a)	1 <sup>st</sup> nest. 4 pulli seen at Day 11 on 20/5. In nest on 22/5 out of nest on 23/5.	
	Reeking Gill west	-	-	-	1 <sup>st</sup> nest. 4 eggs on 30/4. Found predated at egg stage.	
	Reeking Gill quarry	-	-	-	1 <sup>st</sup> nest. 4 eggs on 30/4. Found predated at egg stage.	
	Reeking Gill south	24 April	9 May	20 May (a)	1 <sup>st</sup> nest. 4 eggs laid. 4 days old on 13/5. Fledged at 11 days.	
	Reeking Gill	2 June	17 June (a)	29 June	2 <sup>nd</sup> nest. 2 pulli & 2 eggs 17/6. 3 pulli seen in nest 28/6. 1 dead in nest.	
	Nab Scar south	15 May	-	-	Replacement nest. Predated at egg stage.	
	Farndale - Breckon Bank	19 April	5 May (a)	18 May (a)	1 <sup>st</sup> nest. 2 eggs & 2 newly hatched on 5/5. 2 fledglings close to nest on 18/5.	
	Farndale - High Blakey Moor	25 April	10 May	22 May (a)	1 <sup>st</sup> nest. 4 eggs laid, 4 pulli at Day 6 on 15/5. Fledged at 12 days.	
	Esklets - Esklets Crags south	26 April	11 May	(o)	1 <sup>st</sup> nest. 4 eggs laid, 4 pulli at Day 5 on 15/5. Not checked after 15/5.	
Esklets - Esklets Crags north	26 April	11 May	(o)	1 <sup>st</sup> nest. 4 eggs laid, 4 pulli at Day 5 on 15/5. Not checked after 15/5.		

Year	Nest location	1 <sup>st</sup> Egg	Hatching	Fledging	Comments
2015	Blakey Lion south	-	-	-	1 <sup>st</sup> nest. 3 eggs. Found predated 27/4.
	Round Hill east	26 April (a)	12 May	-	1 <sup>st</sup> nest. 4 eggs. 3 newly hatched & 1 egg on 12/5. Found predated 20/5.
	Round Hill west	-	-	25 May	1 <sup>st</sup> nest. Adults feeding chicks in nest 22/5. Juveniles seen near nest 26/5.
	Hob Crag quarry	-	-	-	1 <sup>st</sup> nest. 4 eggs. Found predated 20/5.
	Hob Crag north	-	-	-	1 <sup>st</sup> nest. 4 eggs. Found predated 20/5.
	Thorgill Bank quarry	8 May (a)	-	-	1 <sup>st</sup> nest. 4 eggs. 1 egg 8/5, 4 eggs 12/5. Found predated 22/5.
	Thorgill Bank west	20 May	6 June	19 June (a)	Replacement nest for Thorgill Bank quarry pair. 4 pulli ringed 14/6.
	Sheriff's Pit	29 April	14 May	27 May	1 <sup>st</sup> nest. 3 pulli close to fledging 26/5.
	Reeking Gill	29 April	14 May	26 May	1 <sup>st</sup> nest. 4 eggs on 11/5. 1 pullus & no eggs on 20/5. 1 pullus ringed 22/5.
	Reeking Gill	31 May	15 June (a)	29 June	2 <sup>nd</sup> nest. 4 eggs on 9/6. 1 pullus just hatched & 3 eggs. 4 pulli ringed 23/6.
	Nab Scar north	30 April	15 May	27 May	1 <sup>st</sup> nest. 3 eggs on 11/5. 2 pulli & no egg on 20/5. 2 pulli ringed 22/5.
	Bank Top	28 April (a)	12 May	-	1 <sup>st</sup> nest. 4 eggs. Found predated 20/5.
	Bank Top	23 May	7 June	19 June (a)	Replacement nest. Found 16/6, 3 pulli 9 days old. 3 pulli ringed 17/6.
	Spindle Thorn	11 May	26 May	8 June	1 <sup>st</sup> nest. 4 eggs. 4 newly hatched pulli 26/5. 4 pulli ringed 2/6.
	Bank Top east	6 May	21 May	4 June	1 <sup>st</sup> nest. Adults feeding fledglings 9/6 & 16/6. Likely 5 days out of nest on 9/6.
2016	Bank Top	-	-	-	1 <sup>st</sup> nest. 4 eggs 22/4. Found predated 1/5.
	Thorgill Bank quarry	8 May	23 May	3 June	1 <sup>st</sup> nest. 4 eggs 10/5, 13/5, 17/5. 1 pullus ringed 29/5.
	Sheriff's Pit	22 April	7 May	20 May	1 <sup>st</sup> nest. 3 pulli seen 17/5.
	Sheriff's Pit	31 May	15 June	28 June	2 <sup>nd</sup> nest. 3 pulli seen 21/6, 24/6.
	Round Hill east	15 April	30 April	-	1 <sup>st</sup> nest. 4 pulli seen 3/5 estimated 3 days old. Found predated 8/5.
	Matty Carr quarry	-	-	-	1 <sup>st</sup> nest. 4 eggs 6/5, 8/5. Found predated 13/5.
(a) = actual (o) = outcome unknown (p) = predated/abandoned					
Dates other than actual are based on a 29-day breeding cycle assuming female commences sitting on 3 <sup>rd</sup> egg and both incubation and chick stage take 13 days.					

#### 4.6 Distance Between First & Second Nests

The distance between first and second nests is shown below in Table 5. Most built their second nest close to the first. The exception to this was the 2009 pair that moved more than half a kilometre to build their second nest - the pair were easily identified by the female's distinct white head marking. Studies by Appleyard in the Yorkshire Dales record a mean distance between first, second and third brood nests of **64** metres with a median of **55** metres (n=26). For the North York Moors the mean and median values are **95** metres and **68** metres respectively (n=28).

Table 5: Distance between 1<sup>st</sup> and 2<sup>nd</sup> nests in Rosedale and other areas of the North York Moors.

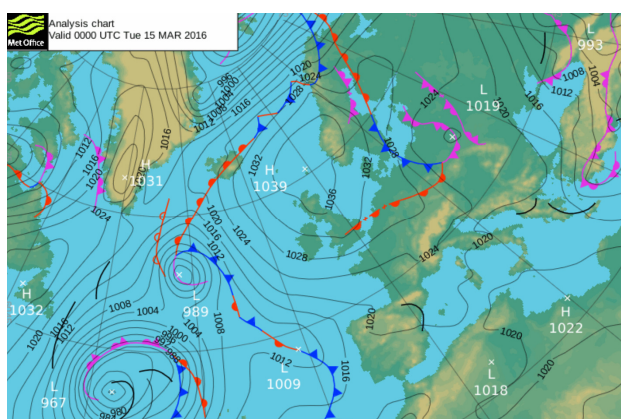
Year	Location	National Grid Reference		Distance (metres)	Comment
		First nest	Second nest		
2003	Thorgill Bank	SE7072195811	SE7073895808	17	
2005	Sheriff's Pit	SE6972196263	SE6972296271	8	
2006	Sheriffs Pit/Sheriff's Pit south	SE6972296268	SE6978496106	173	1 <sup>st</sup> nest - Sheriff's Pit 2 <sup>nd</sup> nest - Sheriff's Pit south
2008	Hob Crag	SE7144295395	SE7138795446	75	2 <sup>nd</sup> is replacement nest
2008	Sturdy Bank	SE6989499907	SE6986599899	30	
2009	Round Hill south/Sheriff's Pit	SE6953396742	SE6972596266	513	1 <sup>st</sup> nest - Round Hill south. 2 <sup>nd</sup> nest - Sheriff's Pit.
2010	Bransdale, Ousegill	SE6399795110	SE6397994971	140	
2010	Hob Crag	SE7138195441	SE7131895441	0	First nest was reused.
2010	Sturdy Bank	NZ6988800004	NZ6987000054	53	
2010	Reeking Gill cutting	NZ6879000661	NZ6885600683	69	
2011	Reeking Gill	NZ6915200719	NZ6916800713	17	
2011	Dalehead west	NZ6792700814	NZ6793700793	23	
2011	Sturdy Bank	NZ6986900050	SE6986899936	114	
2011	Dalehead quarry west	NZ6829600847	NZ6829600847	0	2 <sup>nd</sup> nest on top of 1 <sup>st</sup> nest.
2011	Nab Scar north	SE6945099957	NZ6943800004	48	
2012	Sheriff's Pit north/Sheriff's Pit	SE6967796429	SE6972596266	168	2 <sup>nd</sup> nest as used in 2011.
2013	Hob Crag quarry	SE7144095390	SE7137095430	83	1 <sup>st</sup> & 2 <sup>nd</sup> fledged nests.
2013	Hob Crag quarry	SE7138095420	SE7144095390	67	Predated & 1 <sup>st</sup> fledged nests.
2013	Sheriff's Pit	SE6972096260	SE6971996260	1	
2013	Reeking Gill	NZ6924000790	NZ6950000830	256	
2013	Reeking Gill south	NZ6929000430	NZ6933000450	39	
2013	Round Hill south	SE6968096710	SE6959096700	98	
2014	Round Hill west	SE6926197061	SE6923897087	32	
2014	Sheriff's Pit	SE6979696247	SE6972696269	70	
2015	Bank Top	SE7179594969	SE7055395721	172	1 <sup>st</sup> predated, 2 <sup>nd</sup> fledged.
2015	Reeking Gill	NZ6924500793	NZ6913500649	181	1 <sup>st</sup> & 2 <sup>nd</sup> fledged.
2015	Thorgill Bank quarry/west	SE7074195824	SE7055395721	215	1 <sup>st</sup> predated, 2 <sup>nd</sup> fledged.
2016	Sheriff's Pit	SE6973096260	SE6971996260	3	1 <sup>st</sup> & 2 <sup>nd</sup> fledged nests.
<b>Mean Distance</b>				<b>95.2</b>	<b>metres</b>
<b>Median Distance</b>				<b>68.0</b>	<b>metres</b>

## 5. DISCUSSION

### 5.1 Climate

#### 5.1.1 Local Observations

**March:** After an unsettled start to the month, anti-cyclonic conditions to the north of the country became established that gave settled conditions to much of western Europe during the middle part of March, providing ideal conditions for northerly migration from south-west Europe - see Analysis Chart below. By the end of the month, unsettled conditions returned with showers occurring most days. Storm Katie left a trail of devastation in the south of the country on the 27<sup>th</sup> as she swept in from the Atlantic along the south coast, giving rise to torrential rain for most parts of the country as the weakening low moved north-east into the northern North Sea over the course of the 28<sup>th</sup>, putting a temporary halt to migration northwards as migrants hunkered down to await the easing of the storm. More settled conditions returned as the end of the month approached.



**April:** The start of the April saw unsettled conditions return with rain most days during the first half of the month. Daytime temperatures topped 10 degrees on several days with night time lows remaining above freezing most days; apart from the first few days of the month when frost was recorded. By the start of the second half of the month, drier more settled conditions prevailed as an area of high-pressure became established over the country bringing warm days and cold nights and a prolonged spell of dry weather. It was all change as the month drew to a close with the anticyclonic conditions giving way to a deep low centred to the east of the country. By the last week of April, a cold run of northerly air brought strong winds and frequent heavy rain across the Moors that saw heavy snow fall over-night on the 25/26<sup>th</sup> and 28/29<sup>th</sup>.

**May:** It was all change at the start of May with anti-cyclonic conditions becoming established over the country bringing settled conditions. By the 8<sup>th</sup> daytime temperatures had soared into the low 20s with night temperatures staying in double figures. The second week was all change when an area of low pressure became established over western Europe bringing cold air from the north. Day-time temperatures struggled to make double figures while night temperatures were just a few degrees above freezing. Strong northerly winds were a dominant feature over this period making for cold conditions, though there was little rainfall. Towards the end of the month, unsettled conditions brought cooler conditions with showers most days. Day-time temperatures failed to get beyond the mid-teens, though evening temperatures stayed above 10 degrees. The last day of May saw stormy conditions return with northerly winds gusting to 45 mph and prolonged periods of heavy rain.

**June:** The cold, wet and windy conditions continued until the 4<sup>th</sup> of the month when it was all change and more settled conditions prevailed. By the 7<sup>th</sup> daytime temperatures soared into the mid-twenties, making for uncomfortable conditions in the light southerly air flow. The start of the second week saw daytime temperatures down to more seasonal levels with highs in the upper-teens. Very little rain occurred during this period. A return to northerly winds during the middle period brought cold, damp conditions with mist and rain on several days resulting in temperatures below the seasonal norm. By the 20<sup>th</sup> a shift to a more seasonal westerly air flow brought settled conditions with temperatures back into the low twenties. This brief spell of summer weather came to an abrupt end at the close of the month when the final days saw cold wet conditions return. Day time temperatures struggled to get above 15 degrees while night time lows saw temperatures drop to single figures. Heavy rain occurred most days towards the close of the month.

Graphs of temperature and rainfall for the months April to June 2016 recorded at Westerdale, North York Moors, are shown at Annex 5. Figure 6 below charts the mean temperature and total rainfall for the month of April for the years 2009 to 2016 at Westerdale, while Figure 7 charts the regional mean temperatures and rainfall for the years 2001 to 2016.

The Westerdale weather station is about 180 metres a.s.l. near the village of Westerdale (NZ6605) on the North York Moors and is approximately five km north-west of Rosedale dalehead.

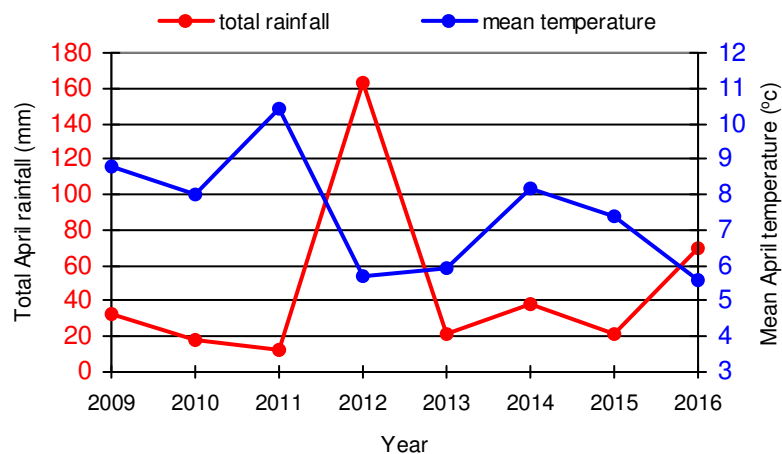


Figure 6: Mean temperature and total rainfall for the month of April recorded at Westerdale, North York Moors, between 2009 and 2016.

## 5.1.2 Regional Values

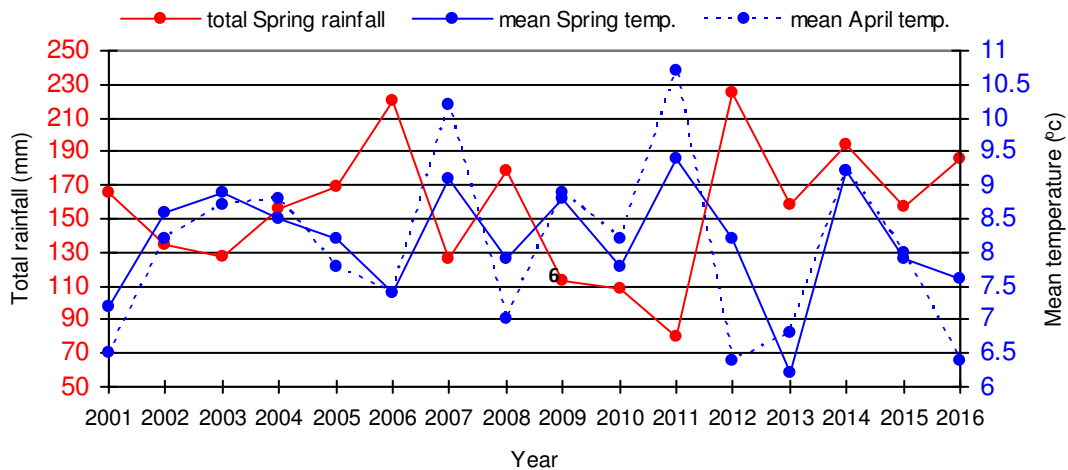


Figure 7: Spring and April mean temperatures and total rainfall between 2001 and 2016. (Data for Met Office North-East England Region. Spring = March, April, May)

## 5.2 First Arrivals

Rosedale was monitored for first arrivals from **20<sup>th</sup> March**. The first Ring Ouzel to be recorded in the dale in 2016 was a single male on the east side at Nab Scar on **24<sup>th</sup> March**; two days later than 2015 and at the same location. On **29<sup>th</sup> March** there were sightings of a singing male at Sledge Shoe north, three males at Sledge Shoe south, one male foraging in the meadow at Round Hill south and an unseen bird singing at Round Hill west. On **31<sup>st</sup> March** a male was seen around the Reeking Gill area while one was seen singing from the cairn at Nab Scar.

On **4<sup>th</sup> April** an unseen male was heard singing at Dalehead west on the west side of the dale while on the east side a single male was seen at Nab Scar. By **7<sup>th</sup> April** three were seen in the Nab Scar area and one on **10<sup>th</sup> April** near the old quarry at Reeking Gill south. On the west side Ring Ouzels were seen on **8<sup>th</sup> April** at Matty Carr quarry, Sledge Shoe, Round Hill west, Round Hill south, Hob Crag quarry and Bank Top, with the first females of the season seen at Round Hill west and Bank Top - both with males. As April progressed, more sightings were recorded in many of the traditional Rosedale territories, including: two unseen males counter singing in the Thorgill Bank quarry area on **12<sup>th</sup> April**, a report of a sighting of a male in a house garden at Blakey Lion on **13<sup>th</sup> April** and a pair at Sheriff's Pit and Spindle Thorn on **15<sup>th</sup> April**.

Elsewhere there was a report of a Ring Ouzel singing at Ousegill, Bransdale, on **29<sup>th</sup> March** and two possibly three males on **3<sup>rd</sup> April** near Ousegill bridge.

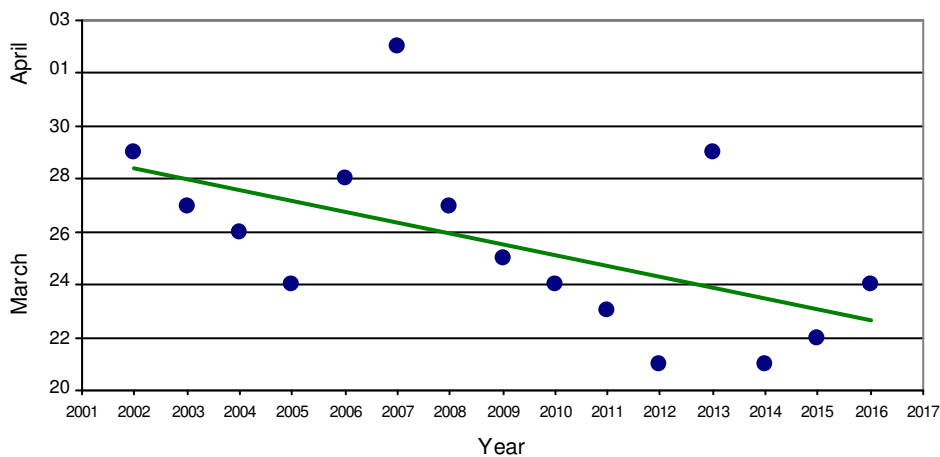


Figure 8: First-arrival date and 15-year trend for the Rosedale area of the North York Moors for the period 2002 to 2016.



### 5.3 Rosedale Territories and Nests

Thirteen Ring Ouzel territories were recorded in 2016 in the Rosedale area of the North York Moors; four less than 2015 and 10 fewer than the peak year of 2012 when 23 territories were recorded. Most territories had been occupied before and some, such as Matty Carr quarry, Round Hill south and Sheriff's Pit, in most years since 1999.

An unexplained situation on the east side of Rosedale was the low number of territories recorded in 2016. Despite the first-arrival been recorded at Nab Scar and pairs seen in Reeking Gill, both well used territories in the past, only one pair held a territory on the east side in 2016 in the quarry at Dalehead - thought likely to be the second nest of a pair that had their first nest at Dalehead west. The reason for the abandonment of the east side of the dale in 2016 is unclear as in the past the north-east corner of the dale has recorded the highest density of breeding pairs over several years, with the Reeking Gill area being guaranteed to host as many as four breeding pairs.

In all, thirty-nine distinct territories have been recorded in the Rosedale area between 1999-2016 (Table 1). The location of the 2016 territories is shown at **Annex 1**.

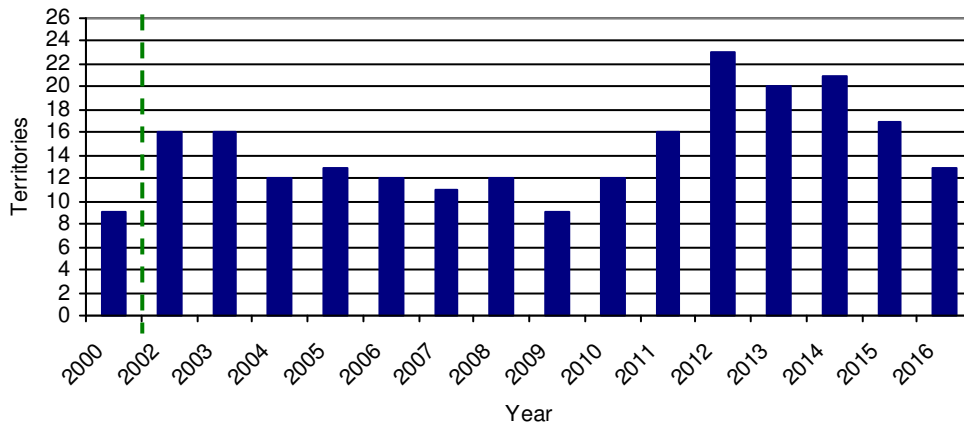


Figure 9: Territories recorded in the Rosedale area of the North York Moors between 2000 and 2016. (foot & mouth prevented field work in 2001)

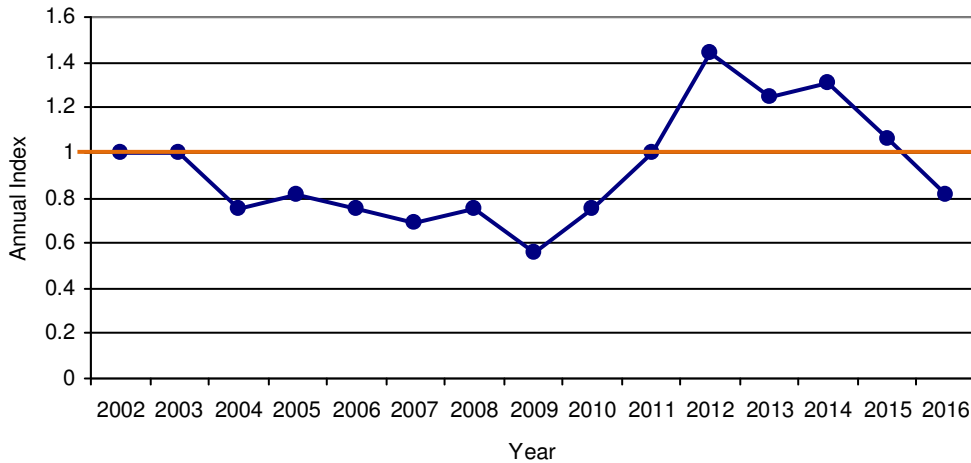


Figure 10: Annual indices of territories recorded in the Rosedale area of the North York Moors between 2002 and 2016 referenced to 2002.

### 5.3.1 Bank Top

The first sighting at Bank Top was on **8<sup>th</sup> April** when a pair was seen foraging part way down the incline. A second male appeared a short while later closer to the road. The female was later seen making her way through the heather towards the moor top. There was a further sighting of a single bird on **12 April** on the moor side of the kilns but was lost from view in the swirling mist. On **22<sup>nd</sup> April** while walking along the track from the road a female was flushed from the heather bank on the moorside of the track about 50 metres from the junction of the track and road. A quick inspection of the bank found a very exposed nest containing four eggs. Returning on **1<sup>st</sup> May** the nest was found to be empty, presumably predated.

There was no further sighting until **3<sup>rd</sup> June** when a male and female were seen collecting food behind the kilns and flying on to the moor top. A closer look at the area where they were seen going into the heather with food flushed two juveniles, both flew off strongly for about 20 metres before dropping into the heather. The juveniles looked to be four to five days out of the nest giving the likely first-egg date for this nest of **1<sup>st</sup> May**; almost certainly the replacement nest for the one predated in late April. The replacement nest was not found.

The underkeeper at Bank Top cottages reported seeing a male on several occasions around the **17<sup>th</sup> June** near the cottages. There were no further sightings after this date.

### 5.3.2 Blakey

There were few sightings at Blakey in 2016. On **19<sup>th</sup> April** two birds were flushed near the top of the path below the Lion Inn. One, a Blackbird re-appeared and flew onto the garden wall.

Seconds later a male ouzel flew across to land in a tree in the garden.

On **21<sup>st</sup> April** a male ouzel was feeding and moving between the two signposts at Blakey Lion.

There was no sign of a female or of any refurbishment of the old nest. There were other inconclusive sightings between Blakey and Dalehead West but no evidence of breeding at Blakey.

### 5.3.3 Dalehead quarry

On **19<sup>th</sup> April** a male ouzel was unexpectedly disturbed from the plateau area trackside just south of Dalehead Quarry. He flew a short distance, chucked briefly and flew strongly across the dale towards Blakey on the west side.

Returning northwards between Reeking Gill and Dalehead Quarry on **21<sup>st</sup> April** a female ouzel was observed in the plateau area dale side before flying into a nearby tree where she preened for five minutes. The male then flew in and alighted close to the track where she flew down close to him. They then flitted over the track and out of view. A search of likely nest sites in the vicinity was sadly unproductive.

There were no further sightings there until **4<sup>th</sup> June** when two, possibly three ouzels were feeding in a grassy gully on the western edge of Dalehead quarry floor and the following day a male and

one other ouzel were again feeding on the western edge of the quarry floor. Intriguingly a third ouzel was heard singing from the direction of the northern end of the quarry. On **6<sup>th</sup> June** a male sang from the quarry and a pair of ouzels fed along the grassy gully on the western side of quarry floor. After watching from the northern end, potential nest sites where an ouzel had disappeared on the previous day were checked without success. Lengthy watches of feeding ouzels from secluded vantage points around the quarry were unproductive.

There was a final sighting of an ouzel on the east side above the quarry on **28<sup>th</sup> June**. No nest was located but it is likely that there was a late season breeding attempt in the vicinity, outcome unknown.

#### **5.3.4 Dalehead & Dalehead west**

On Monday **4<sup>th</sup> April** visibility was down to 25m in fog at Dalehead West when three bursts of simple song were heard from an ouzel probably perched within 100 m but hidden from view in the fog.

Two weeks later on **18<sup>th</sup> April** a male was feeding on the embankment at the head of the dale when a female emerged from cover but both were then flushed by a passing raptor. They were later relocated feeding in the grass and heather mosaic low down below the embankment at Dalehead West. In the hope that the female would return to a nest they were watched for an hour as they fed close together. Eventually they both slowly worked their way up the slope towards the track before being lost to view. It was thought that they may have been prospecting for a nest site. The next day the pair was again located feeding on the embankment at Dalehead where they were again watched for an hour without any clue to a possible nest site. They eventually flew down below Dalehead West and continued to feed.

On **21<sup>st</sup> April** a male ouzel feeding on the embankment was disturbed by a walker and flew to the wall before flying on low down below Dalehead West and the following day a pair fed on the embankment for 20 minutes until disturbed by shepherds when they too flew down to the dry stone wall and away.

On **30<sup>th</sup> April** a male feeding at the edge of the track, dale side about 25m south of the ruin was joined by a female. After feeding for a few minutes they flew a short distance out of view. They did not reappear and an extensive search of likely nest sites dale side was unsuccessful. An hour later the pair flushed again from the track side beyond the ruin and flew towards Dalehead. Watching later from just short of Dalehead West a female was located on a boulder very low down just before the trees alongside the river. She eventually dropped to the ground and began to feed. Something disturbed her for she suddenly flew strongly away low down back in the direction of the Ruin. An hour later after a trail of walkers had passed through and on to Dalehead a male ouzel chucked in to the top of one of the track side mounds. After a brief pause he flew round and out of sight.

There were no further sightings at Dalehead and it is likely that an early season first breeding attempt was unsuccessful.

#### **5.3.5 Hob Crag area**

The first sighting in the Hob Crag area was on **1<sup>st</sup> April** when a male with a bright white gorget was seen part way down the daleside at Hob Crag north. The same male was seen on **8<sup>th</sup> April** at the north end of the quarry. Later the same day two Ring Ouzels flew out of the side quarry where a pair nested in 2105. A pair was seen on **15<sup>th</sup> April** just off the track at Hob Crag north near the 2015 nest site. Both flew off high on to the moor top where the female was observed going into the heather as if prospecting for a nest site; this area was checked on **22<sup>nd</sup> April** but no evidence of a nest could be found. Later the same day the male with a bright gorget was seen foraging in the dalebottom below the quarry.

On **3<sup>rd</sup> May** there was a sighting of a male east of the quarry and later in the day an unseen bird was singing in the wood below the quarry. On **17<sup>th</sup> May** a pair was seen below the quarry foraging (the male with the bright white gorget) and later entering the quarry with food. Despite a thorough search of the quarry later in the day no evidence of a nest could be found. While the pair was being watched a bird was heard singing from behind the quarry towards the moor. Some 10 minutes later a male appeared on a rock above the central part of the quarry that was seen to have a **yellow ring** on the left leg, though unfortunately the distance was too far to read the

lettering on the ring. This was watched for 10 minutes with the bird occasional preening and softly chacking before flying off high northwards out of sight. The impression was that this was an unattached male wandering around the dale in search of a mate - pulli were rung with yellow rings in nests at Bank Top and Thorgill Bank west in 2015.

There were further sightings in the Hob Crag area on **3<sup>rd</sup> June** when a male was seen entering the quarry after being flushed from the track at Hob Crag north. On **10<sup>th</sup> June** a male was seen flying from the grassy area below the track at Hob Crag north and landing on a rock on the moor top. Approaching the area two juveniles were flushed flying strongly towards the male before dropping into the heather. After a few minutes all three flew off in a westerly direction out of sight. A good view of the juveniles showed they had strong markings and a hint of a gorget on one bird. Thought likely they were up to three weeks out of the nest and from a first nest with the clutch laid late April; probably the pair seen prospecting for a nest on **15<sup>th</sup> April**. There were no further sightings in this area and no evidence of a late nest.

### 5.3.6 Matty Carr quarry

The first sighting was on **1<sup>st</sup> April** when a male was seen flying into the tree at the south end of the quarry. On **19<sup>th</sup> April** a pair was seen foraging by the disused railway track mid way between the quarry and Blakey Crossing, both flew a short way down the daleside where the male was later seen perched on the heather while the female explored a nearby gully - as though prospecting for a nest site while the male kept lookout. A closer look on **27<sup>th</sup> April** at the gully where the female had been seen prospecting on the 19<sup>th</sup> found no evidence of a nest.

Walking through the quarry bottom on **6<sup>th</sup> May** a female was flushed from a nest containing four eggs. A further check on **8<sup>th</sup> May** found the female still sitting on four eggs. On **13<sup>th</sup> May** a check on progress found the nest empty presumed predated.

On **7<sup>th</sup> June** a male was seen flying into the holly tree at the north end of the quarry, joined a few minutes later by a second bird; possibly a female. Both flew off northwards and out of sight. On **13<sup>th</sup> June** in very misty conditions an unseen bird was heard singing in the quarry area. A further look in the quarry on **21<sup>st</sup> June** found both adults going into the dense bracken with food. Walking through the quarry three juveniles were flushed. All flew just a short distance before dropping back into the bracken. The fledglings were most likely from a replacement nest for the one that was found predated on 13<sup>th</sup> May. The replacement nest was not found. There was a further sighting in the quarry on **28<sup>th</sup> June** when a male and one juvenile were seen on a rock above the quarry, both flew into the quarry bottom and were lost from view in the dense bracken. There were no further sightings in the quarry area after the end of June and no evidence of a late nest attempt.

### 5.3.7 Nab Scar

As reported earlier the first Ring Ouzel sighting in Rosedale in 2016 was at Nab Scar on **24<sup>th</sup> March** and one week later a male was still present and singing from the cairn below the Scar. Hopes were high that a territory would soon be established here.

On **4<sup>th</sup> April** there were three brief glimpses of a male ouzel north of the cairn but he seemed unusually wary. Two weeks later on **18<sup>th</sup> April** a male was still present but there was no sign of a female. On **20<sup>th</sup> April** a male sang intermittently for 30 minutes then bobbed about for another 30 minutes never moving very far. He eventually flew out of sight behind the cairn before being relocated alongside a female below the cairn dale side. They then flew a short distance south. There was no further indication of any breeding attempt at Nab Scar.

Attempts to locate early season territories here were confused by the presence of unusual numbers of passage birds on the east side especially during the middle of April.

At Nab Scar on **7<sup>th</sup> April** a male was briefly seen on the cairn and shortly afterwards three flew on to Nab Scar South where they remained, occasionally showing themselves. At least two were males.

On **18<sup>th</sup> April** it was a pleasure to find two ouzels feeding low down in the gill at Sturdy Bank. This pleasure was somewhat dampened when they were joined by three more males and a female which emerged from cover. Thought to be passage birds they were watched for 30 minutes as they slowly worked up the Gill feeding steadily.

On **19<sup>th</sup> April** there was no sign of the previous day's ouzels at Sturdy Bank but a male ouzel was flushed from the dale side between Sturdy Bank and Nab Scar South. Beyond this at Nab Scar

both a male and a female ouzel were located but again three more males were found close by. It was impossible to say whether they were all passage birds or whether a pair might remain. On **22<sup>nd</sup> April** a male ouzel was seen in rough pasture south of the kilns at the start of track. It was chased by two blackbirds and flew to the first set of kilns where it was lost from view. At Nab Scar there were still at least seven ouzels, mainly males flying about as a group. They headed towards the pheasant feeding area and then on to the larch trees before eventually flying back southwards.

### **5.3.8 Reeking Gill**

On **31<sup>st</sup> March** a male fed for 20 minutes dale side below the promontory before flying up into Reeking Gill. Later that day a male was heard chacking from the roof of the red barn below Reeking Gill South. Here a male blackbird kept chasing it and after about five minutes the ouzel flew, chacking to the most southerly larch trees near the pheasant feeding area.

There was only one sighting in the area in April when a lone ouzel was disturbed near the quarry at Reeking Gill South on **10<sup>th</sup> April**.

On **6<sup>th</sup> May** Golden Plover were calling as Reeking Gill was approached from the Millennium Stone. An extended period of observation was then commenced at 0830 from close to one of the shooting butts high above the gill.

At 0840 a male sang from a large boulder close to the track far below at the south entrance to the Gill and a good sound recording was obtained. The male eventually dropped to the ground to feed before flying across the Gill and out of view. He later appeared on a ledge on the cliff face on the North West side of the Gill before moving into heather. At 0915 a female ouzel suddenly appeared out of heather at the east end of the cliff. She perched and had a brief shake and flicked her wings several times. She then moved into a different clump of heather and the male came out. Both then flew out of sight down towards the bottom of the gill. The watch point was adjusted further down the gill to observe the two potential nest sites in the hope that the female would return. At 1005 male chacked in and sang from low down in the gill. At 1030 the vigil was adjourned in the expectation that a nest would soon be located in the gill.

On **9<sup>th</sup> May** there was no sign of ouzels during a one hour watch from the south east side of the upper gill. Only a Kestrel flew in to the south east side. With no indication that ouzels were present, the gill was crossed and an extensive search made of the North West side. A search of the two suspected sites and likely areas all along the base of the cliffs was unsuccessful and the search attracted no ouzel response. This was a very disappointing and perplexing outcome in view of the promising activity on 6 May.

The sound recording made on **6<sup>th</sup> May** matched that of a male which had previously nested in the Cutting in 2014.

Further searches in the Gill on **4<sup>th</sup>** and **5<sup>th</sup> June** provided no ouzel contacts. This was the first time for many years that no nest had been located in or close to Reeking Gill and this is the first time in the last ten years that we have not located a nest on the east side. There have been far fewer sightings than usual and these have been frustratingly scattered and inconsistent.

In a final twist just to prove how elusive this species can be at 0945 on **6<sup>th</sup> July**, chacking was heard from bracken just below the embankment dale side of Reeking Gill. A juvenile was seen to make a short flight further down the bank and back in to bracken cover. There were no further sightings but at least one pair had bred successfully.

### **5.3.9 Round Hill east**

The first sighting at this location was on **15<sup>th</sup> April** when a pair were seen just below the old railway track close to the 2015 nest site. The male was seen following the female who appeared to be just foraging. On **22<sup>nd</sup> April** a female was seen going into a heather bank close to last year's nest. After 30 minutes the bank was approached and the female flushed off a nest containing four eggs. Both adults were seen on **3<sup>rd</sup> May** taking food to the nest that on inspection contained four pulli that were estimated to be three days old. Returning to the nest on **8<sup>th</sup> May** to ring the pulli the nest was found empty presumed predated.

On **13<sup>th</sup> May** an unseen male was heard singing from an area close to the predated nest and again on **7<sup>th</sup>** and **13<sup>th</sup> June**. There were no further sightings until **4<sup>th</sup> July** when a short chack and brief snatch of song was heard coming from deep bracken just below the first nest site. A short while later there was a brief view of a female perched on the bracken on the moorside of the track

above the first nest site. There appeared to be several juveniles hidden in the bracken suggesting these were from a replacement nest to the one found predated on 8<sup>th</sup> May. Later the same day a male and female were seen on separate occasions walking along the disused railway track above the first nest. Both eventually flew off in the general direction of Round Hill east. There were no further sightings after this and no evidence of a late nest.

### 5.3.10 Round Hill south

On **29<sup>th</sup> March** a male was seen foraging in the meadow below the crags at Round Hill south. A further sighting was recorded on **8<sup>th</sup> April** when two Ring Ouzels were seen flying north from the direction of the meadow.

There were no further sightings until **7<sup>th</sup> June** when a male and female with at least one juvenile were seen in the meadow below the crags. On **13<sup>th</sup> June** an unseen male was heard counter-singing in the meadow area with one at Round Hill east.

On **4<sup>th</sup> July** what looked to be two juveniles were seen preening on a wall below the crags. Several times they were seen to drop to the ground and forage before returning to the wall. At the same time a male was seen foraging in a grassy patch on the moorside of the fence above the crags. There was a further sighting on **8<sup>th</sup> July** when two juveniles were flushed from the track part way between Sheriff's Pit and Round Hill south. Both flew off strongly towards the meadow at Round Hill south and out of view. It was likely that this was a late brood from a second nest at Round Hill south. There were no further sightings in this area.

### 5.3.11 Round Hill west

On **29<sup>th</sup> March** an unseen bird was heard singing in the Round Hill west area and seemed to be in a tree close to the 2015 nest site. Again on **1<sup>st</sup> April** a male was seen singing in the same tree. On **8<sup>th</sup> April** two males and a female were seen part way down the daleside close to a track leading into the dalebottom. The female was seen 'diving' into the heather bank alongside the track and appeared to be looking for a suitable place to build a nest. She was watched closely by one of the males. The second male flew off in the direction of Sledge Shoe. A look at the area around the heather bank on **27<sup>th</sup> April** found no evidence of a nest.

On **8<sup>th</sup> May**, a male was seen singing in the tree close to last year's nest where a male had been observed singing earlier in the season. No further sightings were recorded until **21<sup>st</sup> June** when a male was seen singing in the same tree as observed before. After a short time the male flew into the dalebottom and foraged before being lost from view. While the bird was singing there seemed to be a brief contact call of a juvenile coming from the bracken below the tree. A sound recording of the Round Hill west and Sledge Shoe males made on the 21<sup>st</sup> June showed they were different males.

On **8<sup>th</sup> July** a juvenile was seen foraging by the disused railway track at the north end of the cutting close to last year's nest site before flying off into the dalebottom to the place where a male had been seen foraging on the 21<sup>st</sup> June. There was no evidence of an early nest at this site and the juveniles recorded in late June early July suggest only late breeding occurred at Round Hill west; possibly the pair who's early nest was predated at Round Hill east. There were no further sightings after this date.

### 5.3.12 Sheriff's Pit

The first sighting at this location was on **4<sup>th</sup> April** when a male and female were seen close to the shaft foraging. On **15<sup>th</sup> April** a female was seen going into the disused pit shaft. Looking into the pit a partially built nest could clearly be seen on the north-west side of the shaft. A further inspection on **19<sup>th</sup> April** found the nest complete, though there was no sign of the adult birds. On **22<sup>nd</sup> April** a pair was seen on the fence surrounding the pit, the female dropping into the shaft before both birds flew off northwards out of sight. Again on **27<sup>th</sup> April** a pair was seen on the fence with the female dropping briefly into the shaft before both birds flew off moorside out of view.

On **3<sup>rd</sup> May** the pair were seen 100 metres south of the pit shaft collecting worms; the female then taking the worms to the pit and dropping into the shaft. The nest was inspected some 15 minutes later and just one egg could be seen - it was thought likely that the others had recently hatched and the hatchlings were tucked in the bottom of the nest. A further look on **10<sup>th</sup> May** found both adults going into the pit with food; though nothing could be seen in the nest. On

**13<sup>th</sup> May** both adults were seen entering the shaft with food and a quick look at the nest found just one pullus visible, while on the **17<sup>th</sup> May** three, possibly four, could be seen moving around. A look on **21<sup>st</sup> May** found the nest empty and three discreet areas of moist droppings just inside the shaft safety fence on the east side. On **7<sup>th</sup> June** both adults were seen in the vicinity of the pit and still feeding the juveniles.

By **13<sup>th</sup> June** a second nest had been constructed three metres from the first and further down the shaft on the same side as the first. On **21<sup>st</sup> June** both adults were seen taking food to the nest which on closer inspection was found to contain three nestlings around five to six days old. A look on **24<sup>th</sup> June** saw both adults taking food into the shaft. On **28<sup>th</sup> June** the nest was found empty. Later both adults were seen with food, the female dropping into the shaft and the male going into a heather bank 10 metres north of the shaft on the moorside of the track. There were no further sightings after this date.

The disused shaft at Sherrif's Pit has been used most years since the study began. Apart from 2006 when a flash storm washed out a first nest, most nests have been successful with the minimum of predation recorded. Given that both nests in 2016 were clearly visible from the security fence, it is surprising that aerial predators have not caused problems given the ease corvids would have perching on the fence posts and wire netting. The shaft is also visited by passing walkers who take delight at peering into the shaft through the fence and, has been witnessed a few times, throwing stones down the shaft to see how deep it is. The Ring Ouzels nesting at Sheriff's Pit seem to have taken all this disturbance in their stride and over the years of the study some 35 young have fledged from nests in the shaft.

### 5.3.13 Sledge Shoe

Three males were seen at Sledge Shoe on **29<sup>th</sup> March**, one singing for over five minutes from a tree in the dalebottom at the north end of the Sledge Shoe territory. On **1<sup>st</sup> April** a male was seen singing in a tree at the south end and later flying off towards Round Hill west out of sight. On **8<sup>th</sup> April** a male and female were flushed from the side of the disused railway track, the female flying to a tree at the south end and the male into the dalebottom out of sight. There was a reported sighting of a pair feeding by the track at the north end of the Sledge Shoe on **20<sup>th</sup> April**. There were no further sightings until **7<sup>th</sup> June** when a male was seen singing in a tree at the north end of the Sledge Shoe territory. The singing continued for over 10 minutes before the male flew off into the dalebottom and out of sight. On **17<sup>th</sup> June** the underkeeper reported seeing a male and female partway down the daleside close to the public footpath, while on **20<sup>th</sup> June** five Ring Ouzels were seen by the headkeeper in the same location. On **21<sup>st</sup> June** a male was seen singing in a tree in the dalebottom and later flying high towards Round Hill with two other birds that looked to be juveniles. A further sighting was made on **8<sup>th</sup> July** when three juveniles were flushed from the track side close to the footpath. All flew over the cam-edge into the dalebottom and out of sight, returning a few minutes later to the grassy area just below the track where they were observed for five or so minutes foraging. This was the last sighting at Sledge Shoe.

There was a pair at Sledge Shoe throughout the breeding season but there was no evidence of a successful early nest. It was thought that the three juveniles were from a replacement nest, the first nest most likely having been predated.

### 5.3.14 Spindle Thorn area

The first sighting here was on **15<sup>th</sup> April** when a male and female flew from the thorn tree on the east side of the road towards Loskey Beck. On **22<sup>nd</sup> April** a male was seen flying from the Loskey Beck area in an easterly direction and later a male was seen foraging close to the road at Spindle Thorn. There was a further sighting of a male singing in the thorn tree at Spindle Thorn on **1<sup>st</sup> May** and later the same day a male was flushed from the hollow on the west side of the road. Again on **3<sup>rd</sup> May** two males were heard counter-singing, one in a tree part way down the daleside on the west side of the road the other in the Loskey Beck area. On **10<sup>th</sup> May** a male was seen singing in a holly tree on the west side of the beck at Loskey Beck and later on the wall of the old sheepfold at Penwash before flying off high in the direction of Bank Top. The head-keeper reported seeing a male on the west side of the road on **3<sup>rd</sup> June**.

On **10<sup>th</sup> June** a pair was flushed from the grassy area on the east side of the road, both flew off in an easterly direction towards Hole Beck. When approaching Hole Beck an unseen male was heard singing in the vicinity of the beck and later a female was seen foraging 50 metres to the

east of Hole Beck. A short time later a male was seen with food flying high from the Hole Beck area towards Spindle Thorn. Later what appeared to be an adult and three juveniles was seen flying high over the moor in the Spindle Thorn area. A final sighting was made on **17<sup>th</sup> June** when a bird was seen flying from the Loskey Beck area over the road and landing out of sight on the east side of the track. A look at the area flushed a male that flew off back westwards and out of view.

There were no further sightings after this date and no evidence of a late nest.

### **5.3.15 Thorgill Bank quarry**

The first evidence of Ring Ouzel activity at this location was on **12<sup>th</sup> April** when two males were heard counter-singing. Thick mist prevented a sighting but one seemed to be in the quarry area and the other close to the old sheep fold. On **15<sup>th</sup> April** a male was seen singing on the cairn below the quarry and later in the day a male and female were seen entering the disused quarry. Again on **22<sup>nd</sup> April** a male was observed singing in a tree below the cairn, a brief look at the quarry found no evidence of a nest. On **3<sup>rd</sup> May** an unseen male was heard singing from the area below the cairn. A look in the quarry on **10<sup>th</sup> May** flushed a female off a nest containing four eggs. A further inspection of the nest on **13<sup>th</sup>** and **17<sup>th</sup> May** found four eggs still being incubated. On **23<sup>rd</sup> May** an inspection of the nest found a very recently hatched chick and two eggs; one chipped and in the process of hatching. By the **29<sup>th</sup> May** the nest contained just one pullus which was ringed, the fate of the other three eggs was unknown. The nest was inspected on **3<sup>rd</sup> June** and found to be empty, later both adults were seen near the nest with the female taking food to the one fledgling which was seen two metres away from the nest. On **10<sup>th</sup> June** the male was seen on top of the cairn and later the one juvenile was flushed in the main part of the quarry, flying a short distance westwards. A further sighting of the male singing near the quarry and the juvenile was made on **17<sup>th</sup> June**.

This was the first time a pair had nested in the quarry since 2003 when a controlled burn in April 2004 on the adjacent moor entered the quarry and destroyed the heather slope.

There was no further sighting after 10<sup>th</sup> June and no evidence of a late nest.

### **5.3.16 Thorgill Bank west**

The first sighting at this location was on **15<sup>th</sup> April** when a male was seen singing in a tree down the gill below Thorgill Head. A further sighting occurred on **20<sup>th</sup> April** when a male was seen chacking just off the track at Thorgill Head. There were no further sightings until **10<sup>th</sup> May** when a male was seen singing on the wall of the old sheep fold close to the 2015 nest. Again on the **13<sup>th</sup> May** a male was seen on the ground below the sheep fold singing. On **17<sup>th</sup> May** a male was seen in the tree in the gill where one had been observed on 15<sup>th</sup> April. There was a further sighting of a male and three juveniles on **17<sup>th</sup> June** at Thorgill Head. All were seen flying strongly on to the moor top before dropping to the ground and later flying back high eastwards towards the old sheep fold. There were no further sightings after this date suggesting this was an early territory with no evidence of a late nest.

## **5.4 Breeding Productivity**

Three early nests were found predated, accounting for 25% of the first nests of the 12 breeding pairs recorded in 2016. Two nests, Bank Top and Matty Carr quarry, were predated at the egg stage and one, Round Hill east, at the chick stage. These early failures are reflected in the below average figure for productivity shown in Figure 11 where the mean number of fledged young per laying pair is 2.55 compared with a 15-year mean of 3.10. This is the fourth year since 2012 that below average productivity has been recorded.

Most ring ouzels will attempt a replacement nest if the first fails, though this may not be for a week or more later. As a consequence it may be well into June before the young from this nest fledge - assuming all goes well and the replacement nest is not predated. For most birds this would make it too late in the season to start a late second nest, with the breeding season ending for most ring ouzels around the first week or so in July. In effect, for those birds that had their first nest predated, they would have run-out of time and the breeding season for them would be over with at best just one successful clutch to show for the season.



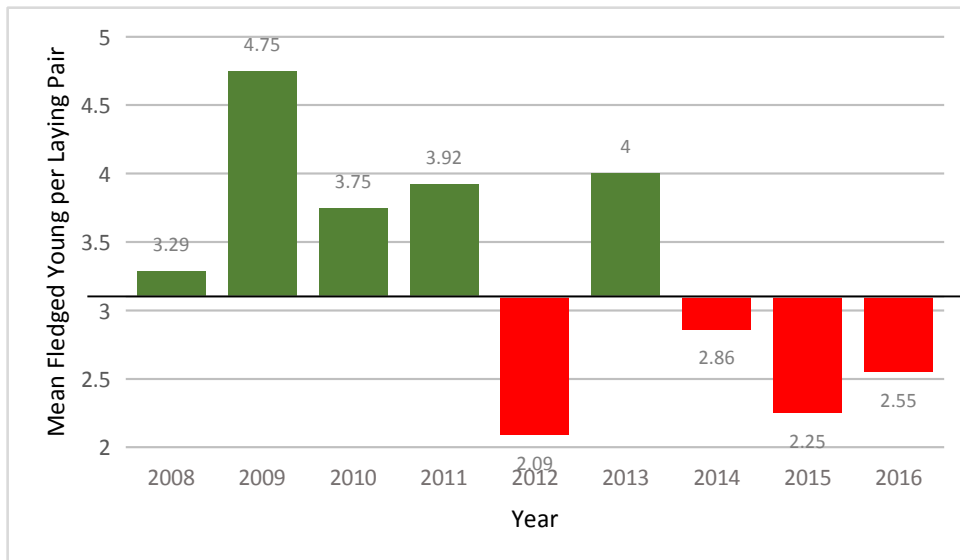


Figure 11: Mean fledged young per laying pair for Rosedale and other areas of the North York Moors between 2008 and 2016 relative to 15-year mean of 3.10

Figures 12 and 13 below show the annual hatching and fledging success for first and second nests. Hatching success looks at all the eggs laid and the percentage of these that hatched. Similarly, fledging success looks at all the eggs laid and the percentage of these that hatched and successfully fledged. A value of 1.0 would indicate 100% success whereas 0.5 would indicate 50% success - that is only half of all the eggs laid hatched or fledged. In 2016 over half, 59%, of first nest eggs hatched with just under a third, 32%, fledging successfully - only a marginal improvement on the previous low of 2015. Although only three second nests were monitored, 100% of all the eggs laid hatched and fledged successfully.

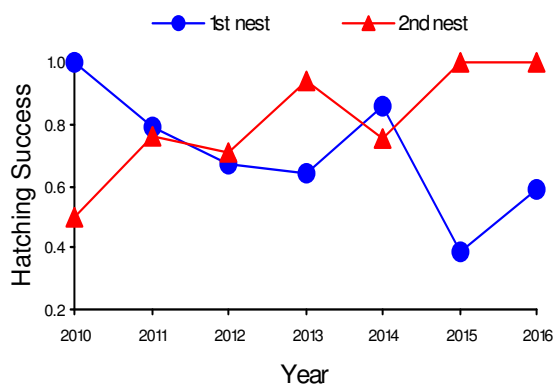


Figure 12: Annual first and second nest hatching success for the Rosedale area of the North York Moors between 2010-2016. Data from Annex 3, Table 1, for known and likely values.

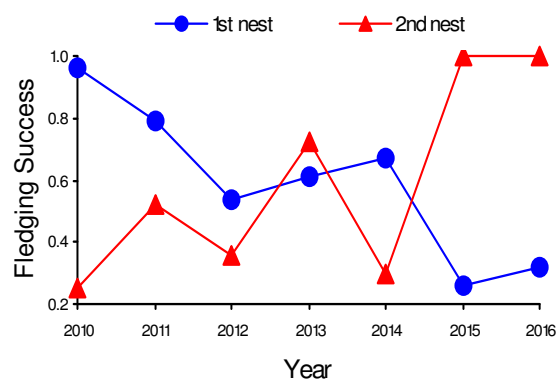


Figure 13: Annual first and second nest fledging success for the Rosedale area of the North York Moors between 2010-2016. Data from Annex 3, Table 1, for known and likely values.

## 5.5 Late:Early Territory Occupancy

Most bird publications describe the Ring Ouzel as usually being a double brooded species. As not all pairs will have a second nest and fledge a further clutch, one of the concerns is what impact this has on population numbers. For a short lived species, three years for the average Ring Ouzel would be a good age, having a second brood may be important in sustaining or expanding the population.

The method used to determine early and late occupancy was to divide the number of territories that were occupied by pairs after late May (late territories) by the number occupied before late May (early territories) - see Annex 5. The graph at Figure 14 below shows the ratio of late to early occupancy between 2008 and 2016. Although there is some variation between years the nine-year trend is relatively flat averaging 0.57, suggesting 57 % of Rosedale birds have, on average, a second nest. Compared with the poor years of 2014 and 2015, 2016 was only just below the long-term average with 54% of pairs having a late nest.

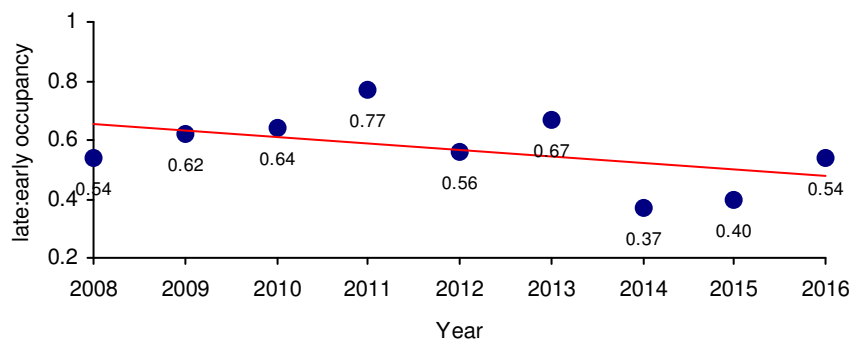


Figure 14: Annual ratio of late to early territory occupancy for the Rosedale area of the North York Moors between 2008-2016 and nine-year trend.

## 5.6 Nest Aspect

The aspect of a nest is the compass bearing that the nest entrance faces and is the direction the adult birds are seen to use most to enter or exit the nest. It is likely that the topography has a strong influence on nest aspect in Rosedale. The main dale runs NW to SE and on the east side, where it might be expected that more nests would face west, the two main offshoot gills of Reeking Gill and Sturdy Bank and the quarry at Dalehead seem to present fewer opportunities for nests to face this direction. Likewise, on the west side of the dale the quarries at Matty Carr and Hob Crag predominantly face east as do the heather banks at Blakey Lion, Dalehead west and Round Hill east and south. Only at Round Hill west where the disused railway cutting has ideal heather banks for nesting, with a choice of either east or west facing aspects, do Ring Ouzels prefer the side of the cutting facing east. At Sheriff's Pit where the four sides of the shaft entrance are aligned either NE, NW, SW or SE, the preferred aspect is either SE or NE; though this has probably more to do with the suitability of the shaft sides for nesting. The graph at Fig.15 for all nests in the Rosedale area (data from 1999 to 2015) clearly shows a strong bias to an easterly bearing, with the north-east quadrant being the predominant aspect. For reasons that can't be explained, the south-west quadrant seems to be equally as prominent as the north-east quadrant for second nests - see Fig. 16 and 17. However, what is clear from all three graphs is that few nests are built with an aspect in the north-west quadrant. Whether this is a deliberate move by Rosedale Ring Ouzels or not is uncertain and is an area of study that needs further work.

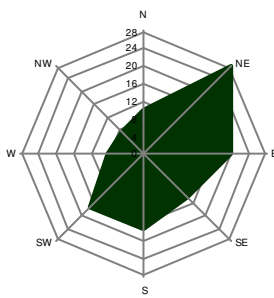


Figure 15: Nest aspect of all nests in the Rosedale area.  
Data from Annex 4, Table 1. n=121

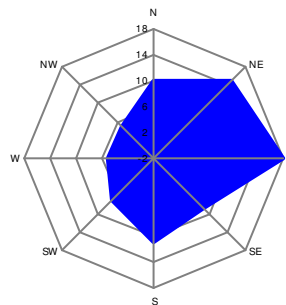


Figure 16: Nest aspect of first nests in the Rosedale area.  
Data from Annex 4, Table 1. n=80

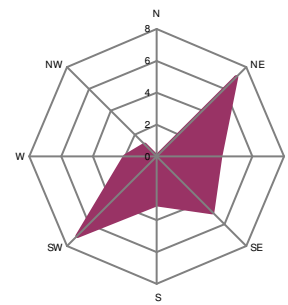


Figure 17: Nest aspect of second nests in the Rosedale area.  
Data from Annex 4, Table 1. n=29

In Figures 15 to 17 above the intercardinal points NNE, ENE etc. are not shown. This is done to smooth the graphs and remove the spikes that would be generated if all 16 points were displayed. For each of the eight intercardinal points shown in Annex 4, Table 1, the value (the number of nests with that aspect) is halved and apportioned to each adjacent cardinal point. For example, if the number of nests having an intercardinal aspect of NNE was four, then two would be added to the N cardinal value and two to the NE cardinal value. If the ENE aspect had three nests, then one would be added to NE and one to E. None of the intercardinal points recording just one nest are counted.

## 5.7 Nest Elevation

Due to the low-lying nature of the terrain, most ring ouzel territories in the North York Moors are confined to a narrow altitudinal band lying between the 250 and 400 metre contours. The highest point on the North York Moors lies at 454 metres on Urra Moor and in Rosedale just over 400 metres at Rosedale Head. In the Rosedale area the lowest nest was found at Loskey Beck at 218 metres and the highest above Reeking Gill at 392 metres; with the mean and median altitude being 324 and 331 metres respectively. Around 70% of nests were found in a 50 metre band between the 300 and 350 metre contour. The restricted altitudinal band for breeding ring ouzels points to climate change being a potential problem in the coming years for the North York Moors population. Figure 18 shows the elevation of 139 nests recorded in the Rosedale area of the North York Moors between 1999 and 2016.

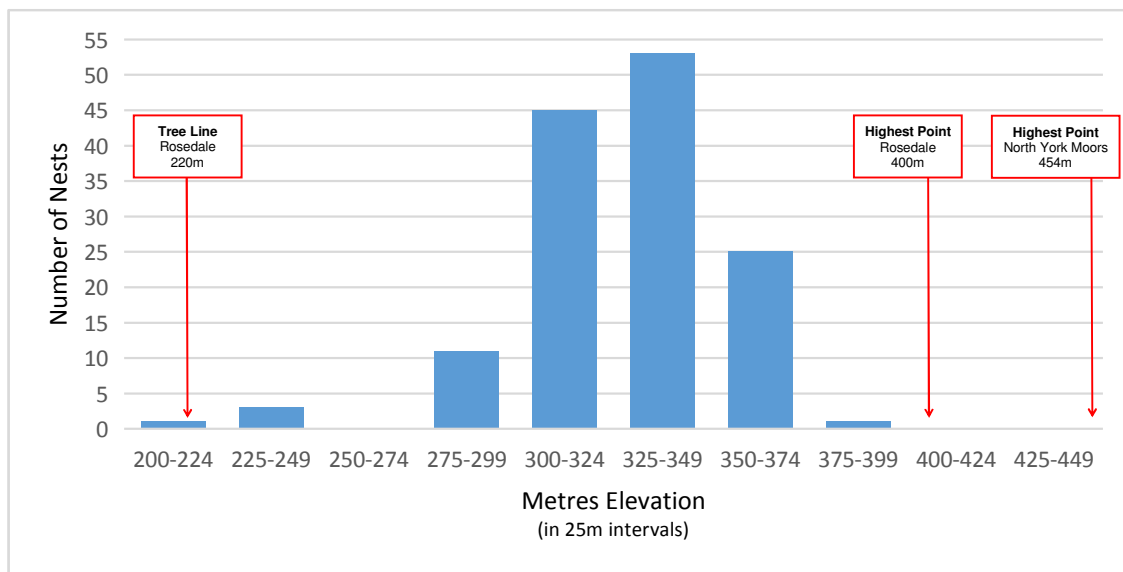


Figure 18: Elevation above mean sea level of nests recorded in the Rosedale area of the North York Moors between 1999 and 2016. Data from Annex 4, Table 1. n=139

## 5.8 Spring Passage Migrants

After the exceptional start to the 2015 season, which proved to be an abnormal year for the sheer number of Fennoscandia birds seen on passage to the east and south of the country, 2016 was more the norm with sightings reported in the usual places inland and along the east coast.

On the North York Moors, six Ring Ouzels (6 male & 1 female) were seen on the east side of Rosedale at Sturdy Bank on **18<sup>th</sup> April**, while on **22<sup>nd</sup> April** seven-plus (mainly males) were seen in the Nab Scar area on the east side of Rosedale.

Several sightings were reported along the Yorkshire coast during **April**: on the **4<sup>th</sup>** a male was seen at Spurn and a female at Holderness, on the **14<sup>th</sup>** three were seen at Spurn and two to four on various days between the **15<sup>th</sup>** and **23<sup>rd</sup>** of the month at Sammys Point, Spurn. Further up the coast at Filey a male was recorded on the **5<sup>th</sup>** and a single bird at Humanby Gap on the **15<sup>th</sup>**.

## 5.9 Late Summer Activity

As in previous years an end of season visit was made to Rosedale specifically to locate Ring Ouzels prior to migration. A look at Blakey Swang, Matty Carr quarry and along the cam-edge to Sledge Shoe on **31<sup>st</sup> August** found a family of Ring Ouzels (male + female & 2 Juveniles) flying together around the Swang area and in the Rowan trees just north of the Swang bottom feeding on the plentiful supply of berries.

A second visit on **12<sup>th</sup> September** to Spindle Thorn, Bank Top and Thorgill Bank quarry was not so well rewarded with only a possible sighting in the Hob Crag area of a single Ring Ouzel in flight.

There was a further sighting on **23<sup>rd</sup> September** reported by Cath at the Blakey Lion of a male and female in her garden.

## 6. ACKNOWLEDGEMENTS

The authors wish to acknowledge the support of Spaunton estate owner, George Winn-Darley, head-keeper George Thompson and under-keeper Anthony Orr, and the Westerdale and Rosedale Estate. Also Tom Denney, Wilf Norman, Jim Pewtress, Chris Tyas and Eric Wood. Our grateful thanks to all of them.

## 7. REFERENCES

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## ANNEX 1 - Map of Nest Sites and Territories in the Rosedale Area in 2016

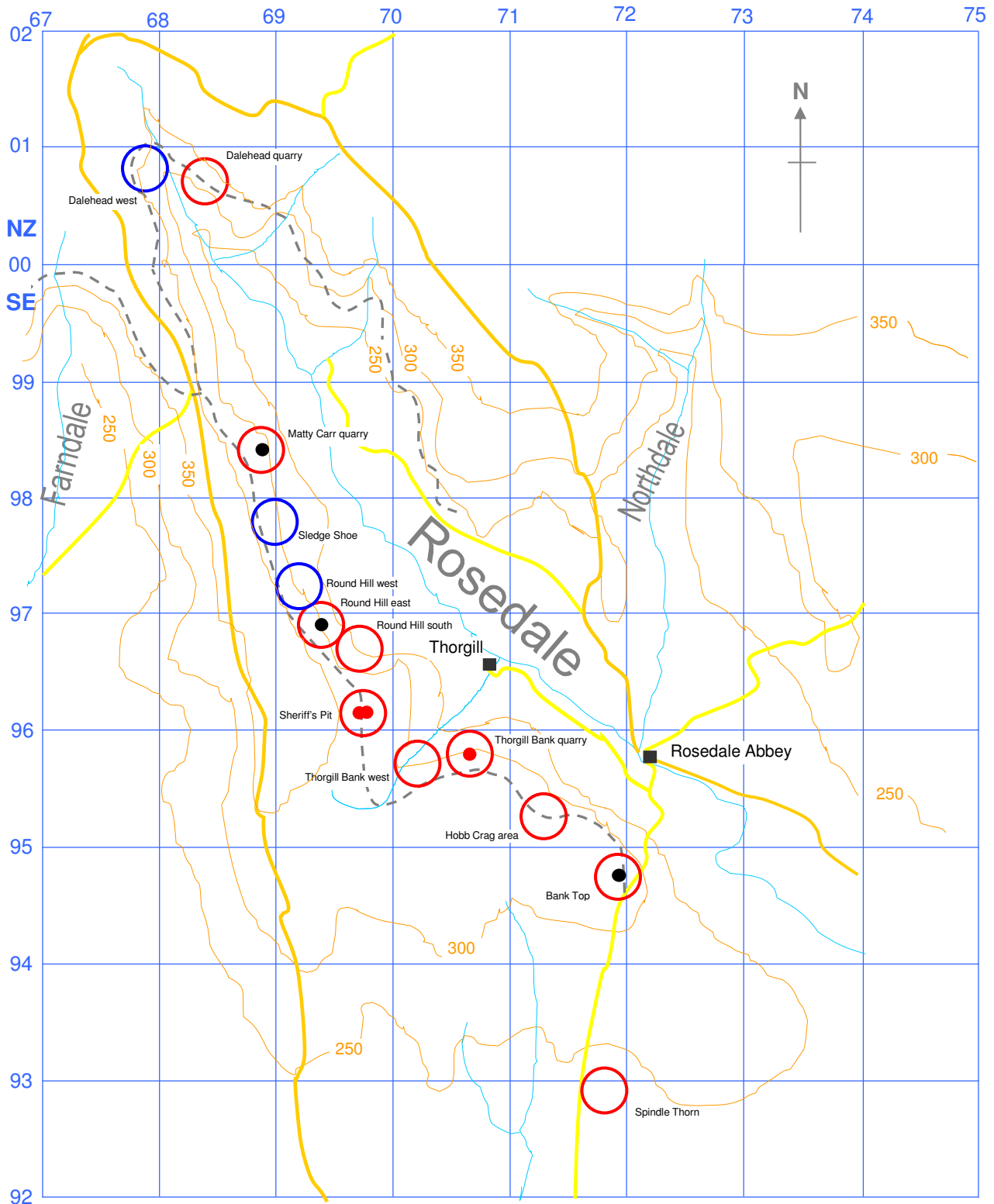


Diagram 1: Ring Ouzel nest sites and territories where Confirmed or Probable breeding was recorded in the Rosedale area of the North York Moors in 2016.

- Successful nest.
- Precated or abandoned nest.
- Territory where Confirmed breeding was recorded.  
(Circle size is notional range of territory)
- Territory where Probable breeding was recorded.  
(Circle size is notional range of territory)

**ANNEX 2 - Map of Sightings on the North York Moors in 2016  
(Other than the Rosedale area & passage migrants)**

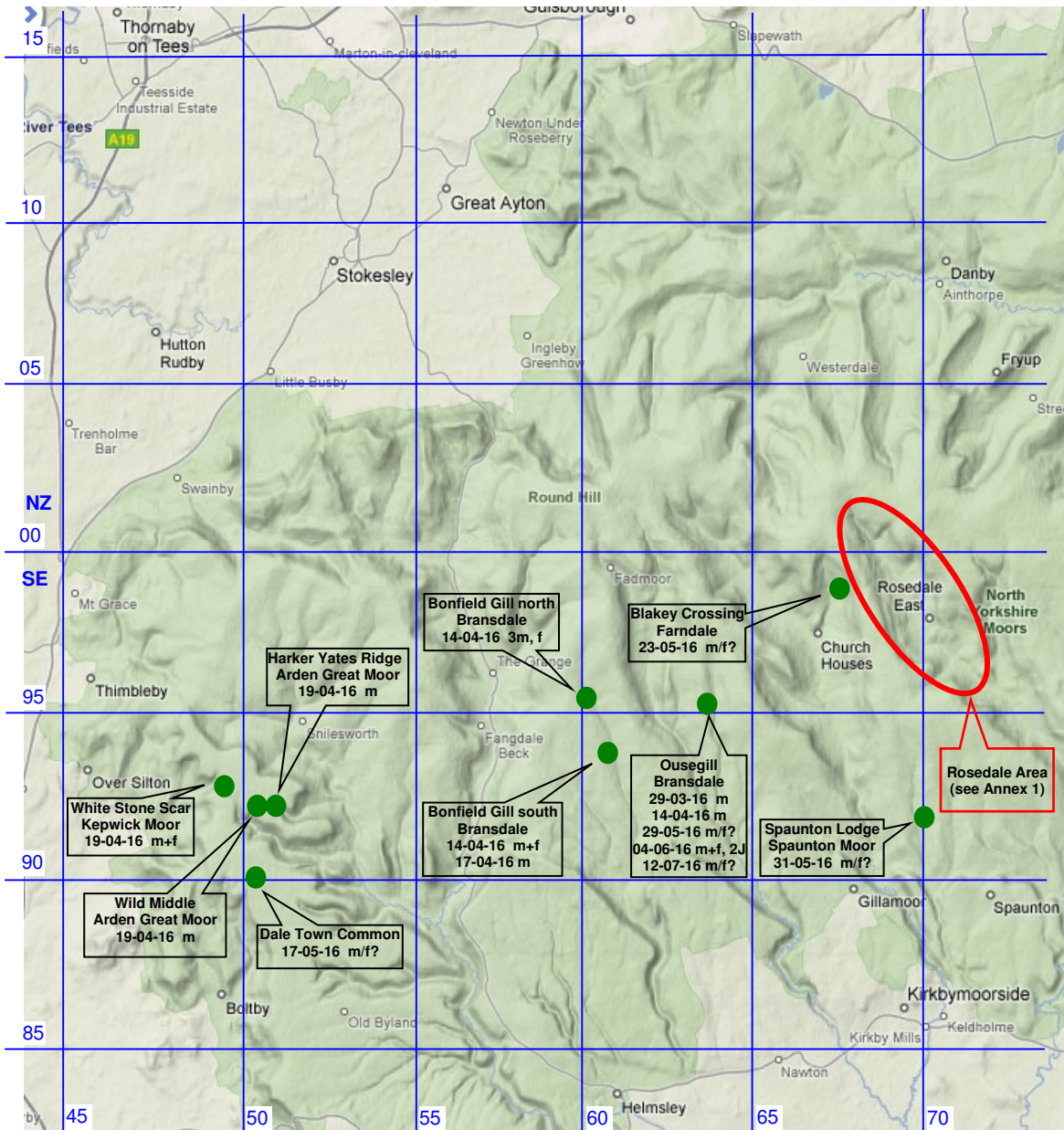


Diagram 1: Sightings of Ring Ouzels on the North York Moors in 2016 other than the Rosedale area and passage migrants.

## ANNEX 3 - Table of Annual Breeding Results from 2000 to 2016

Table 1: Annual breeding results at Ring Ouzel nest sites in the Rosedale and other areas of the North York Moors. Data from 2000 to 2016.

Year	Site	Grid Ref.	Eggs	Hatched	Fledged	Comments
2000	Spaunton Moor - Pen Wash	SE71479347	4	4	4	1 <sup>st</sup> brood. 4 pulli ringed.
2002	Bank Top	SE72049483	(4)	4	4	Likely to be 2 <sup>nd</sup> brood.
2003	Ouzegill Bdg.	SE63709450	4	4	4	1 <sup>st</sup> brood. 4 pulli ringed.
2003	Round Hill	SE69279710	4	4	4	1 <sup>st</sup> brood
2003	Thorgill Head	SE69999559	4	3	0	1 <sup>st</sup> brood. Nest disturbed, chicks abandoned.
2003	Thorgill Bank	SE70729582	4	3	3	1 <sup>st</sup> brood. 3 pulli ringed.
2003	Thorgill Bank	SE70729582	2	1	?	2 <sup>nd</sup> brood. Likely to have failed at pulli stage.
2003	Spaunton Moor - Pen Wash	SE71489347	4	+	0	1 <sup>st</sup> nest. Predated at pulli stage.
2003	Hob Crag	SE71459538	4	0	0	Likely to be 1 <sup>st</sup> nest. Predated at egg stage.
2004	Hob Crag	SE71459538	4	4	0	Predated at pulli stage. Refurbished 2003 nest.
2004	Matty Carr	SE68809833	4	4	4	Likely to be 1 <sup>st</sup> brood.
2004	Dale Hd East	NZ68560086	4	4	4	Likely to be 2 <sup>nd</sup> brood.
2004	Ouzegill Bdg.	SE63909470	2	1	?	1 <sup>st</sup> brood. 1 egg vanished. 1 pulli ringed.
2005	Sheriff's Pit 1 <sup>st</sup>	SE69659631	+	1	0	1 <sup>st</sup> nest. Nest abandoned; reason unknown.
2005	Sheriff's Pit 2 <sup>nd</sup>	SE69659631	+	0	0	2 <sup>nd</sup> attempt. Predated at egg stage.
2005	Sheriff's Pit 3 <sup>rd</sup>	SE69659631	+	3	2	3 <sup>rd</sup> nest.
2005	Matty Carr quarry	SE68809835	4	4	4	Thought to be 1 <sup>st</sup> brood.
2005	Lion Inn	SE68249954	(4)	4	4	Likely to be 2 <sup>nd</sup> brood.
2005	Dale Hd West	NZ67960082	+	+	3	3 fledglings seen near nest.
2006	Sheriff's Pit 1 <sup>st</sup>	SE69659631	4	0	0	Nest on NW side of pit shaft washed out by heavy rain in mid May.
2006	Sheriff's Pit 2 <sup>nd</sup>	SE69779609	5	5	5	2 <sup>nd</sup> attempt 185m south of pit shaft.
2006	Dale Hd West	NZ67930081	4	+	+	Likely to be 2 <sup>nd</sup> brood. Not known if hatched or fledged.
2007	Hob Crag	SE71459538	3	0	0	1 <sup>st</sup> nest. Predated at egg stage.
2007	Round Hill Sth	SE69819663	4	4	4	1 <sup>st</sup> nest.
2007	Dale Hd West	NZ67940079	4	4	4	1 <sup>st</sup> nest.
2007	Reeking Gill	NZ68920066	4	4	4	1 <sup>st</sup> nest.
2008	Sturdy Bank 1 <sup>st</sup>	SE69899991	4	4	4	1 <sup>st</sup> nest.
2008	Sturdy Bank 2 <sup>nd</sup>	SE69869990	4	4	3	2 <sup>nd</sup> nest.
2008	Round Hill Sth	SE69819664	4	4	4	1 <sup>st</sup> nest. Used refurbished 2007 nest.
2008	Reeking Gill	NZ69140056	5	5	5	1 <sup>st</sup> nest.
2008	Northdale, West Gill	SE71799957	+	+	3	1 <sup>st</sup> nest.
2008	Hobb Crag 1 <sup>st</sup>	SE71449539	+	4	0	1 <sup>st</sup> attempt. Predated at pulli stage. Used 2003/4 nest site.
2008	Hobb Crag 2 <sup>nd</sup>	SE71399545	3	0	0	2 <sup>nd</sup> attempt. Predated at egg stage.
2008	Sheriff's Pit	SE69719626	4	4	4	1 <sup>st</sup> brood.
2008	Dalehead Nth.	NZ67950102	4	1	0	Likely to be 2 <sup>nd</sup> attempt. Failed after 1 <sup>st</sup> hatchling. 1egg left in nest.
2009	Dale Hd West	NZ67940079	4	4	4	1 <sup>st</sup> nest.
2009	Sturdy Bank	SE69879991	4	4	3	Likely to be 1 <sup>st</sup> nest.
2009	Round Hill Sth	SE69539674	4	4	4	1 <sup>st</sup> nest.
2009	Reeking Gill	NZ69240076	+	+	3	1 <sup>st</sup> nest.
2009	Sheriff's Pit	SE69729627	(5)	5	5	2 <sup>nd</sup> nest. 1 <sup>st</sup> nest at Round Hill Sth.
2010	Ouzegill 1	SE64009511	4	4	3	1 <sup>st</sup> nest. 1 left early & died near nest.
2010	Ousegill 2	SE63989497	5	3	0	2 <sup>nd</sup> nest 140m sth of 1st nest. Predated at pulli stage. 2 eggs left.
2010	Ousegill Bridge	SE63929444	5	0	0	Likely to be 2 <sup>nd</sup> nest. Predated at egg stage.
2010	Sturdy Bank 1 <sup>st</sup>	NZ69890000	3	3	3	1 <sup>st</sup> nest.
2010	Sturdy Bank 2 <sup>nd</sup>	NZ69870005	3	0	0	2 <sup>nd</sup> nest. Predated at egg stage.
2010	Reeking Gill	NZ69080068	(4)	4	4	1 <sup>st</sup> nest.
2010	Reeking Gill cut 1 <sup>st</sup>	NZ68790066	4	4	4	1 <sup>st</sup> nest.
2010	Reeking Gill cut 2 <sup>nd</sup>	NZ68860068	(3)	3	3	2 <sup>nd</sup> nest 69m east of first nest.
2010	Hob Crag 1 <sup>st</sup>	SE71389544	(4)	4	4	1 <sup>st</sup> nest.
2010	Hob Crag 2 <sup>nd</sup>	SE71389544	(4)	4	2	2 <sup>nd</sup> nest using same nest as 1 <sup>st</sup> nest.
2010	Sheriff's Pit	SE69739627	+	3	3	1 <sup>st</sup> nest.
2010	Round Hill (central)	SE69439690	(4)	4	4	1 <sup>st</sup> nest.
2011	Hob Crag	SE71239557	(4)	4	4	1 <sup>st</sup> nest.
2011	Round Hill east	SE69459685	(4)	4	4	1 <sup>st</sup> nest.
2011	Round Hill west	SE69269706	4	4	4	1 <sup>st</sup> nest.
2011	Matty Carr quarry	SE68809836	4	4	4	1 <sup>st</sup> nest.
2011	Ousegill Bridge	SE63969475	4	0	0	1 <sup>st</sup> nest. Likely to have been predated at egg stage.
2011	Sturdy Bank 1 <sup>st</sup>	NZ69870005	3	3	3	1 <sup>st</sup> nest.
2011	Sturdy Bank 2 <sup>nd</sup>	SE69879994	4	3	0	2 <sup>nd</sup> nest. Nest predated. 1 egg unsure if hatched.
2011	Nab Scar north 1 <sup>st</sup>	SE69459996	4	4	4	1 <sup>st</sup> nest.
2011	Nab Scar north 2 <sup>nd</sup>	NZ69440000	4	3	3	2 <sup>nd</sup> nest. One egg left in nest.
2011	Reeking Gill 1 <sup>st</sup>	NZ69150072	4	+	+	1 <sup>st</sup> nest. Fledged; assumed all 4 left nest.
2011	Reeking Gill 2 <sup>nd</sup>	NZ69170071	5	5	5	2 <sup>nd</sup> nest.
2011	Dalehead west 1 <sup>st</sup>	NZ67930081	4	3	3	1 <sup>st</sup> nest. One egg left in nest.
2011	Dalehead west 2 <sup>nd</sup>	NZ67940079	4	3	3	2 <sup>nd</sup> nest. One egg left in nest.
2011	Dalehead quarry west 1 <sup>st</sup>	NZ68290085	4	4	4	1 <sup>st</sup> nest.
2011	Dalehead quarry west 2 <sup>nd</sup>	NZ68290085	4	+	0	2 <sup>nd</sup> nest. Nest predated at chick stage.
2011	Dalehead east	NZ68650075	4	4	4	Likely to be 2 <sup>nd</sup> nest.
2011	Dalehead north	NZ68050125	(4)	4	4	1 <sup>st</sup> nest.
2011	Thorgill Bank	SE70669580	4	4	0	2 <sup>nd</sup> nest. Likely to have been predated at chick stage.
2011	Sheriff's Pit	SE69739627	+	2	2	Likely to be 2 <sup>nd</sup> nest.

? = Outcome unknown    + = Exact value unknown    (4) = Most likely value



Year	Site	Grid Ref.	Eggs	Hatched	Fledged	Comments
2012	Reeking Gill cutting	NZ68810067	4	4	4	1 <sup>st</sup> nest.
2012	Nab Scar south	SE69499988	4	3	3	1 <sup>st</sup> nest. 4 eggs laid, 1 removed.
2012	Sturdy Bank	SE69859996	4	-	-	1 <sup>st</sup> nest. Nest abandoned at egg stage.
2012	Dalehead west	NZ67940080	4	-	-	1 <sup>st</sup> nest. Nest abandoned at egg stage.
2012	Sheriff's Pit north	SE69689643	4	4	4	1 <sup>st</sup> nest.
2012	Sheriff's Pit	SE69739627	+	+	2	2 <sup>nd</sup> nest.
2012	Round Hill south	SE69449670	4	4	0	1 <sup>st</sup> nest. Nest predated at chick stage.
2012	Reeking Gill	NZ69190066	4	4	4	1 <sup>st</sup> nest.
2012	Blakey Lion	SE68239960	5	3	3	1 <sup>st</sup> nest. 2 fledged 7/6 & 1 fledged 8/6.
2012	Matty Carr south	SE68889818	3	3	0	2 <sup>nd</sup> nest. Nest predated at chick stage.
2012	Matty Carr quarry	SE68809835	(3)	3	0	Likely replacement 2 <sup>nd</sup> nest from Matty Carr south pair.
2012	Round Hill west	SE69269706	4	4	3	Likely to be 2 <sup>nd</sup> nest. One pulli died naturally in nest.
2012	Nab Scar north	NZ69430006	4	0	0	2 <sup>nd</sup> nest. Nest predated at egg stage.
2012	Spaunton Knowl	SE71709180	+	3	?	1 <sup>st</sup> nest. 3 naked pulli on 24/5. Outcome unknown.
2013	Reeking Gill cutting	NZ68870065	4	0	0	1 <sup>st</sup> nest. 4 eggs 14/5. Found abandoned 19/5.
2013	Dalehead west	NZ67940079	4	3	3	1 <sup>st</sup> nest. 1 hatched 13/5. 3 pulli 23/5. 1 egg left in nest.
2013	Reeking Gill 1.	NZ69240079	4	4	4	1 <sup>st</sup> nest. 3 pulli 13/5, 4 pulli 21/5. Fledged.
2013	Reeking Gill 2.	NZ69500083	(3)	2	2	2 <sup>nd</sup> nest. 2 pulli on 21/6 at Day 9/10 stage. Fledged 24/6 1 egg left.
2013	Reeking Gill south 1.	NZ69290043	4	2	2	1 <sup>st</sup> nest. 2 pulli at Day 6 on 22/5. 2 eggs unhatched.
2013	Reeking Gill south 2.	NZ69330045	(4)	4	4	2 <sup>nd</sup> nest. 4 pulli on 21/6 at Day 2 stage. Fledged
2013	Hob Crag quarry 2nd	SE71389542	4	0	0	2 <sup>nd</sup> nest first clutch. Predated at egg stage.
2013	Hob Crag quarry 3rd	SE71449539	4	3	2	3 <sup>rd</sup> nest second clutch. 3 hatched 20/5. 2 pulli in nest on 1/6.
2013	Hob Crag quarry 4th	SE71379543	4	4	4	4 <sup>th</sup> nest third clutch.
2013	Hob Crag north	SE71189566	3	3	0	Late 2 <sup>nd</sup> nest. 3 eggs on 27/6. Hatched 4/7. Predated.
2013	Sheriff's Pit 1.	SE69729626	+	2	2	1 <sup>st</sup> nest. Look to be 2 pulli. 2 fledglings seen near nest on 27/5.
2013	Sheriff's Pit 2.	SE69729626	+	3	3	2 <sup>nd</sup> nest. Look to be 3 pulli at possibly at Day 8 stage on 24/6.
2013	Round Hill west	SE69259705	4	4	4	1 <sup>st</sup> nest (late). 4 pulli seen in nest 10/6. Fledged 11/6.
2013	Round Hill south 1.	SE69689671	4	3	3	1 <sup>st</sup> nest. Still in nest on 30/5. Likely fledged 31/5. 1 egg broken.
2013	Round Hill south 2.	SE69599670	4	4	3	2 <sup>nd</sup> nest. 1 just hatched, 1 hatching, on 1/7. 1 dead left in nest.
2013	Blakey Lion north	SE68049997	(4)	4	4	1 <sup>st</sup> nest. Likely to have fledged after 12 days.
2014	Round Hill west	SE69269706	4	4	3	1 <sup>st</sup> nest. 3 pulli seen on 12/5. Fledged 15/5.
2014	Round Hill west	SE69249709	4	4	0	2 <sup>nd</sup> nest. 4 pulli seen at Day 6 on 19/6. Predated between D6 & 10.
2014	Round Hill east	SE69419681	4	4	4	1 <sup>st</sup> nest. 1 egg 3 pulli just hatched on 12/5. 4 pulli 19/5 7 days old.
2014	Blakey Lion south	SE68269954	4	4	4	1 <sup>st</sup> nest.
2014	Hob Crag quarry	SE71379543	4	4	0	1 <sup>st</sup> nest. Predated at chick stage.
2014	Thorgill Bank quarry	SE70739582	3	+	0	1 <sup>st</sup> nest. Predated at chick stage. 2 eggs 1 pullus just hatched 5/5.
2014	Thorgill Head	SE69909568	5	4	0	Replacement nest. Found predated 7/6 4 pulli 3 days 1 egg left.
2014	Matty Carr quarry	SE68809836	4	4	3	1 <sup>st</sup> nest. 4 pulli 4 days old on 19/5. Likely fledged 28/5 at 12 days.
2014	Spindle Thorn	SE71319313	4	4	4	1 <sup>st</sup> nest. 4 pulli seen at Day 11 on 20/5. Fledged 23/5 at 13 days.
2014	Sheriff's Pit	SE69799625	(4)	4	4	1 <sup>st</sup> nest. 4 pulli 29/5 11 days. Nest empty & 2 dead near nest 31/5.
2014	Sheriff's Pit	SE69739628	(3)	3	3	2 <sup>nd</sup> nest. 3 pulli on 30/6 at Day 8/9. Fledged 6/7.
2014	Reeking Gill west	NZ69030069	4	0	0	1 <sup>st</sup> nest. 4 eggs on 30/4. Predated at egg stage.
2014	Reeking Gill quarry	NZ69170053	4	0	0	1 <sup>st</sup> nest. 4 eggs on 30/4. Predated at egg stage.
2014	Reeking Gill south	NZ69280044	4	4	4	1 <sup>st</sup> nest. 4 days old on 13/5. Fledged at 11 days.
2014	Reeking Gill	NZ69120066	4	(4)	3	2 <sup>nd</sup> nest. 2 pulli just hatched & 2 eggs on 17/6. 3 pulli on 28/6.
2014	Nab Scar south	SE69529986	4	0	0	Replacement nest? F. sitting on 4 eggs on 21/5. Predated.
2014	Farndale - Breckon Bank	SE68699508	4	4	4	1 <sup>st</sup> nest. 2 eggs & 2 pulli hatched 5/5. Fledged 18/5 at 13 days.
2014	Farndale - High Blakey Moor	SE66679945	4	4	4	1 <sup>st</sup> nest. Fledged 22/5 at 12 days.
2014	Esklets -Esklets Crag south	NZ66250159	4	4	?	1 <sup>st</sup> nest. 4 pulli on 15/5, 4 days old. Nest not checked after 15 <sup>th</sup> .
2014	Esklets -Esklets Crag north	NZ65910236	4	4	?	1 <sup>st</sup> nest. 4 pulli on 15/5, 4 days old. Nest not checked after 15 <sup>th</sup> .
2015	Spindle Thorn	SE71319320	4	4	4	1 <sup>st</sup> nest. 4 pulli just hatched 25/5. Likely fledged 5/6.
2015	Bank Top	SE71799497	4	1	0	1 <sup>st</sup> nest. 1 pullus & 3 eggs on 12/5. Found predated 20/5.
2015	Bank Top	SE71749480	(3)	3	3	Replacement nest. 3 pulli on 16/6 at 9days. Fledged 19/6.
2015	Hob Crag quarry	SE71429536	4	?	0	1 <sup>st</sup> nest. 4 eggs 12/5. Found predated 20/5.
2015	Hob Crag north	SE71239558	4	0	0	1 <sup>st</sup> nest. 4 eggs 12/5. 4 eggs 20/5 & nest abandoned.
2015	Thorgill Bank quarry	SE70749586	4	0	0	1 <sup>st</sup> nest. 1 egg 8/5. 4 eggs 12/5. Found predated 22/5.
2015	Thorgill Bank west	SE70549571	4	4	4	Replacement nest for TB quarry. 4 pulli 3 days 6/6. Fledged 19/6.
2015	Sheriff's Pit	SE69739627	(4)	4	3	1 <sup>st</sup> nest. 4 seen 22/5, 3 seen 26/5 about to fledge.
2015	Round Hill east	SE69419681	4	3	0	1 <sup>st</sup> nest. 3 pulli & 1 egg on 12/5. Found predated 20/5.
2015	Blakey Lion south	SE68209960	3	0	0	1 <sup>st</sup> nest. 3 eggs removed from nest. Nest predated.
2015	Reeking Gill	NZ69210076	4	1	1	1 <sup>st</sup> nest. 4 eggs 11/5. 1 pullus no eggs 20/5. Likely fledged 26/5.
2015	Reeking Gill	NZ69120066	4	4	4	2 <sup>nd</sup> nest. 4 eggs 9/6. 1 hatch 3 eggs 15/6. Likely fledged 29/5.
2015	Nab Scar north	SE69449997	3	2	2	1 <sup>st</sup> nest. 3 eggs 11/5. 2 pulli no egg 20/5. Likely fledged 27/5.
2015	Round Hill west	SE69249709	+	+	3	1 <sup>st</sup> nest. 3 juvs being fed by adults 26/5. Likely fledged 26/5.
2015	Bank Top east	SE72--94--	+	+	3	Fledglings seen being fed by Adults 9/6 & 16/6.
2016	Bank Top	SE72039473	4	0	0	1 <sup>st</sup> nest. Predated.
2016	Bank Top	SE71899471	+	+	2	2 <sup>nd</sup> (replacement) 2 fledglings seen being fed by Adults
2016	Hob Crag	SE71259544	+	+	2	1 <sup>st</sup> nest. 2 fledglings seen being fed by Adults
2016	Thorgill Bank quarry	SE70729581	4	3	1	1 <sup>st</sup> nest. 1 fledgling seen being fed by Adult.
2016	Sheriff's Pit	SE69739627	(3)	3	3	1 <sup>st</sup> nest.
2016	Sheriff's Pit	SE69739627	(3)	3	3	2 <sup>nd</sup> nest.
2016	Round Hill south	SE69699673	+	+	(3)	1 <sup>st</sup> nest. 1 fledgling seen being fed by Adults 7/6.
2016	Round Hill south	SE69699673	+	+	(2)	2 <sup>nd</sup> nest. 2 fledgling seen being fed by Adults 2/7.
2016	Round Hill east	SE69419681	4	4	0	1 <sup>st</sup> nest.
2016	Matty Carr quarry	SE68809838	4	(0)	0	1 <sup>st</sup> nest. Predated.
2016	Matty Carr quarry	SE688-983-	(3)	(3)	3	2 <sup>nd</sup> nest (replacement). 3 fledglings seen being fed by Adults
2016	Thorgill west	SE701-955-	(3)	(3)	3	1 <sup>st</sup> nest. Male & 3 fledglings flying strong around T.west area.
2016	Sledge Shoe	SE690-976-	(3)	(3)	3	2 <sup>nd</sup> nest. 3 fledglings seen being fed by Adults

? = Outcome unknown + = Exact value unknown (4) = Most likely value

## ANNEX 4 - Table of Nest Aspect and Elevation from 1999 to 2016

Table 1: Aspect & elevation of nest sites mainly in the Rosedale area of the North York Moors.

Year	Location	Grid Reference	Aspect	Elevation
1999	Rosedale - Sheriff's Pit	SE 6973 9627	NNW	331m
1999	Blakey Crossing	SE 6830 9900	SSW	370m
2000	Spaunton Moor - Penwash	SE 7147 9347	SSW	240m
2002	Rosedale - Bank Top	SE 7204 9483	NNW	310m
2003	Rosedale - Round Hill	SE 6927 9710	N	336m
2003	Rosedale - Hobb Crag	SE 7145 9538	NNE	313m
2003	Rosedale - Thorgill Head	SE 6999 9559	NNE	330m
2003	Rosedale - Thorgill Bank	SE 7073 9580	NE	308m
2003	Spaunton Moor - Penwash	SE 7148 9347	NE	249m
2003	Rosedale - Thorgill Bank	SE 7072 9582	ENE	309m
2004	Rosedale - Matty Carr Hill	SE 6880 9833	E	358m
2004	Rosedale - Sheriff's Pit	SE 6971 9626	SSE	331m
2004	Rosedale - DaleHead (east)	NZ 6856 0086	SW	330m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	NE	339m
2005	Rosedale - Blakey Lion	SE 6824 9954	ENE	362m
2005	Rosedale - Dale Head (west)	NZ 6796 0082	E	349m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	ESE	333m
2005	Rosedale - Matty Carr Hill	SE 6880 9835	SE	331m
2005	Rosedale - Sheriff's Pit	SE 6971 9626	SW	331m
2006	Rosedale - Sheriff's Pit (south)	SE 6979 9610	N	339m
2006	Rosedale - Dale Head (west)	NZ 6793 0080	E	362m
2006	Rosedale - Sheriff's Pit	SE 6971 9626	ESE	333m
2007	Rosedale - Reeking Gill (west)	NZ 6892 0066	N	321m
2007	Rosedale - Round Hill (south)	SE 6981 9664	NNE	297m
2007	Rosedale - Hob Crag	SE 7138 9546	E	313m
2007	Rosedale - Dale Head (west)	NZ 6794 0079	S	357m
2008	Rosedale - Round Hill (south)	SE 6981 9664	NNE	297m
2008	Rosedale - Hob Crag 1 <sup>st</sup>	SE 7144 9539	NNE	310m
2008	Rosedale - Hob Crag 2 <sup>nd</sup>	SE 7139 9545	NE	313m
2008	Northdale - West Gill	SE 7179 9957	NE	308m
2008	Rosedale - Dalehead (north)	NZ 6795 0102	NE	353m
2008	Rosedale - Sheriff's Pit	SE 6971 9626	SSE	331m
2008	Rosedale - Sturdy Bank 1 <sup>st</sup>	SE 6989 9991	W	307m
2008	Rosedale - Sturdy Bank 2 <sup>nd</sup>	SE 6986 9990	SSW	281m
2008	Rosedale - Reeking Gill	NZ 6914 0056	W	322m
2009	Rosedale - Reeking Gill	NZ 6924 0076	S	359m
2009	Rosedale - Sturdy Bank	SE 6987 9991	SW	282m
2009	Rosedale - Dale Head (west)	NZ 6794 0079	S	357m
2009	Rosedale - Round Hill (south)	SE 6953 9674	NE	330m
2009	Rosedale - Sheriff's Pit	SE 6972 9627	NE	345m
2010	Rosedale - Sturdy Bank	NZ 6988 0004	W	324m
2010	Rosedale - Hob Crag (1 <sup>st</sup> & 2 <sup>nd</sup> )	SE 7138 9544	NE	315m
2010	Rosedale - Sheriff's Pit	SE 6973 9627	NE	340m
2010	Rosedale - Round Hill (central)	SE 6943 9690	ENE	328m
2010	Rosedale - Reeking Gill	NZ 6908 0068	SE	317m
2010	Rosedale - Reeking Gill cutting 1 <sup>st</sup>	NZ 6879 0066	S	328m
2010	Rosedale - Reeking Gill cutting 2 <sup>nd</sup>	NZ 6886 0068	SE	329m
2010	Rosedale - Dalehead (quarry west)	NZ 6828 0082	S	281m
2010	Bransdale - Ousegill 1 <sup>st</sup>	SE 6400 9511	W	250m
2010	Bransdale - Ousegill 2 <sup>nd</sup>	SE 6398 9497	E	250m
2010	Bransdale - Ousegill Bridge	SE 6392 9444	W	225m
2011	Rosedale - Hob Crag (north)	SE 7123 9557	NW	313m
2011	Rosedale - Thorgill Bank	SE 7066 9580	NW	307m
2011	Rosedale - Sheriff's Pit	SE 6972 9627	SE	343m
2011	Rosedale - Round Hill (east)	SE 6945 9685	E	321m
2011	Rosedale - Round Hill (west)	SE 6926 9706	NE	352m
2011	Rosedale - Matty Carr quarry	SE 6880 9836	NW	343m
2011	Rosedale - Dalehead (north)	NZ 6805 0125	SW	341m
2011	Rosedale - Dalehead (west) 1 <sup>st</sup>	NZ 6793 0081	SW	352m
2011	Rosedale - Dalehead (west) 2 <sup>nd</sup>	NZ 6794 0080	SW	347m
2011	Rosedale - Dalehead (east)	NZ 6865 0076	NE	328m
2011	Rosedale - Dalehead quarry (west) 1 <sup>st</sup> & 2 <sup>nd</sup>	NZ 6830 0085	E	296m
2011	Rosedale - Reeking Gill 1 <sup>st</sup>	NZ 6915 0072	S	333m
2011	Rosedale - Reeking Gill 2 <sup>nd</sup>	NZ 6917 0071	S	319m
2011	Rosedale - Nab Scar north 1 <sup>st</sup>	SE 6945 9996	SW	337m
2011	Rosedale - Nab Scar north 2 <sup>nd</sup>	NZ 6944 0000	SW	339m
2011	Rosedale - Sturdy Bank 1 <sup>st</sup>	NZ 6987 0005	E	343m
2011	Rosedale - Sturdy Bank 2 <sup>nd</sup>	SE 6987 9994	W	288m
2011	Bransdale - Ousegill	SE 6396 9475	E	240m

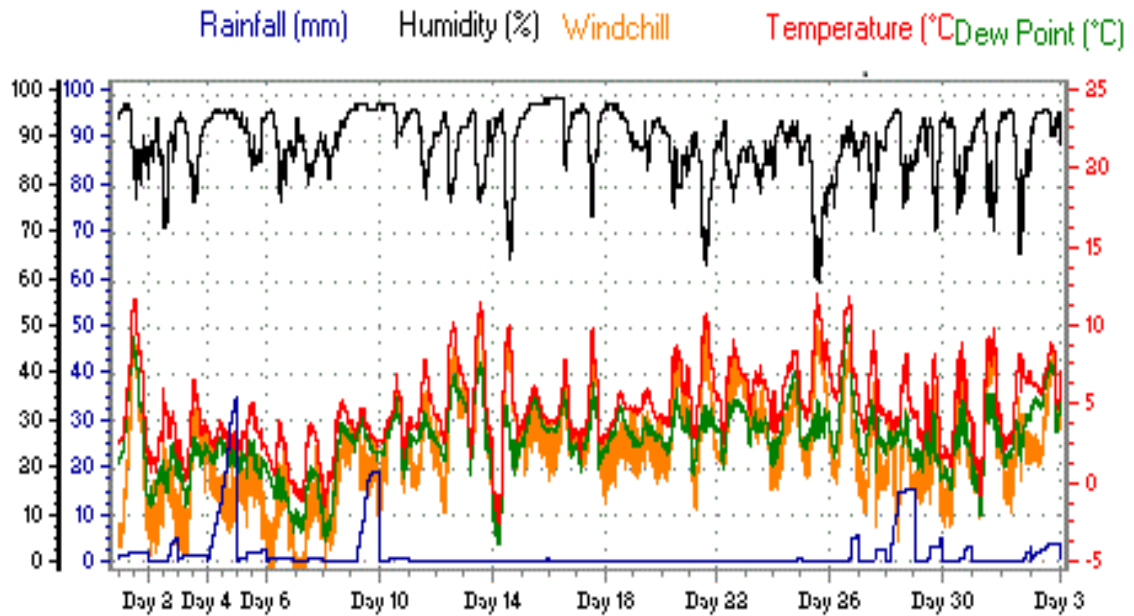
Year	Location	Grid Reference	Aspect	Elevation
2012	Rosedale - Sheriff's Pit (north)	SE 6968 9643	N	343m
2012	Rosedale - Round Hill (south)	SE 6944 9670	NW	350m
2012	Rosedale - Dalehead (west)	NZ 6794 0080	SW	347m
2012	Rosedale - Reeking Gill cutting	NZ 6881 0067	S	328m
2012	Rosedale - Reeking Gill	NZ 6919 0066	N	334m
2012	Rosedale - Nab Scar (south)	SE 6949 9988	SSW	330m
2012	Rosedale - Sturdy Bank	SE 6985 9996	SSE	300m
2012	Rosedale - Blakey Lion	SE 6823 9960	E	366m
2012	Rosedale - Matty Carr (south)	SE 6888 9819	SSE	357m
2012	Rosedale - Round Hill (west)	SE 6926 9706	NE	352m
2012	Rosedale - Nab Scar (north)	NZ 6943 0006	SSW	345m
2012	Rosedale - Sheriff's Pit	SE 6972 9627	SE	343m
2012	Rosedale - Matty Carr quarry	SE 6880 9835	SE	331m
2013	Rosedale - Hob Crag quarry 1 <sup>st</sup> (abandoned)	SE 7137 9543	-	-
2013	Rosedale - Hob Crag quarry 2 <sup>nd</sup> (predated)	SE 7138 9542	NW	305m
2013	Rosedale - Hob Crag quarry 3 <sup>rd</sup> 1 <sup>st</sup> fledged	SE 7144 9539	N	295m
2013	Rosedale - Hob Crag quarry 4 <sup>th</sup> 2 <sup>nd</sup> fledged	SE 7137 9543	NE	304m
2013	Rosedale - Hob Crag north	SE 7118 9566	E	314m
2013	Rosedale - Thorgill Bank	SE 7075 9584	ENE	294m
2013	Rosedale - Sheriff's Pit 1 <sup>st</sup> & 2 <sup>nd</sup>	SE 6972 9626	SE	343m
2013	Rosedale - Round Hill south 1 <sup>st</sup>	SE 6968 9671	NNE	279m
2013	Rosedale - Round Hill south 2 <sup>nd</sup>	SE 6959 9670	ENE	307m
2013	Rosedale - Round Hill west	SE 6925 9705	ENE	344m
2013	Rosedale - Blakey Lion north	SE 6804 9997	E	365m
2013	Rosedale - Dalehead west	NZ 6794 0079	E	354m
2013	Rosedale - Reeking Gill cutting	NZ 6887 0065	N	335m
2013	Rosedale - Reeking Gill 1 <sup>st</sup>	NZ 6924 0079	SE	370m
2013	Rosedale - Reeking Gill 2 <sup>nd</sup>	NZ 6950 0083	SSE	392m
2013	Rosedale - Reeking Gill south 1 <sup>st</sup>	NZ 6929 0043	WSW	358m
2013	Rosedale - Reeking Gill south 2 <sup>nd</sup>	NZ 6933 0045	WSW	367m
2014	Rosedale west - Round Hill west 1 <sup>st</sup>	SE 6926 9706	NE	350m
2014	Rosedale west - Round Hill west 2 <sup>nd</sup>	SE 6924 9709	E	351m
2014	Rosedale west - Round Hill east	SE 6941 9681	NE	339m
2014	Rosedale west - Blakey Lion south	SE 6826 9954	E	369m
2014	Rosedale west - Hob Crag quarry	SE 7137 9543	NE	304m
2014	Rosedale west - Thorgill Bank	SE 7073 9582	E	308m
2014	Rosedale west - Thorgill Head	SE 6990 9568	WSW	331m
2014	Rosedale west - Matty Carr quarry	SE 6880 9836	W	327m
2014	Rosedale west - Spindle Thorn	SE 7131 9313	NW	218m
2014	Rosedale west - Sheriff's Pit 1 <sup>st</sup>	SE 6980 9625	E	337m
2014	Rosedale west - Sheriff's Pit 2 <sup>nd</sup>	SE 6973 9627	NNE	340m (ground level 343m)
2014	Rosedale east - Reeking Gill west	NZ 6903 0069	S	318m
2014	Rosedale east - Reeking Gill quarry	NZ 6917 0053	S	310m
2014	Rosedale east - Reeking Gill south	NZ 6928 0044	WSW	358m
2014	Rosedale east - Reeking Gill	NZ 9162 0066	SW	307m
2014	Rosedale east - Nab Scar south	SE 6952 9986	SSW	332m
2014	Farndale east - Breckon Bank	SE 6869 9508	SSW	315m
2014	Farndale east - High Blakey Moor	SE 6667 9945	SSE	373m
2014	Esklets east - Esklets Crag south	NZ 6625 0159	SW	309m
2014	Esklets east - Esklets Crag north	NZ 6591 0236	SW	287m
2015	Rosedale - Thorgill Bank quarry	SE 7075 9584	ENE	294m
2015	Rosedale - Thorgill Bank west	SE 7055 9572	NNW	316m
2015	Rosedale - Sheriff's Pit 1 <sup>st</sup>	SE 6972 9626	SE	343m
2015	Rosedale - Spindle Thorn	SE 7131 9320	E	228m
2015	Rosedale - Bank Top 1 <sup>st</sup>	SE 7179 9497	SSE	321m
2015	Rosedale - Bank Top 2 <sup>nd</sup> (replacement)	SE 7174 9480	NE	321m
2015	Rosedale - Round Hill east	SE 6941 9681	NE	339m
2015	Rosedale - Hob Crag	SE 7142 9536	NE	315m
2015	Rosedale - Hob Crag north	SE 7123 9558	SW	315m
2015	Rosedale - Blakey Lion south	SE 6823 9960	NE	363m
2015	Rosedale - Reeking Gill 1 <sup>st</sup>	NZ 6924 0079	S	358m
2015	Rosedale - Reeking Gill 2 <sup>nd</sup>	NZ 6913 0065	SW	304m
2015	Rosedale - Nab Scar north	SE 6944 0001	W	343m
2016	Rosedale - Bank Top	SE 7203 9473	ENE	331m
2016	Rosedale - Thorgill Bank quarry	SE 7072 9581	E	300m
2016	Rosedale - Sheriff's Pit 1 <sup>st</sup>	SE 6972 9626	SE	343m
2016	Rosedale - Sheriff's Pit 2 <sup>nd</sup>	SE 6972 9626	SE	343m
2016	Rosedale - Round Hill east	SE 6941 9681	NE	339m
2016	Rosedale - Matty Carr quarry	SE 6880 9838	E	335m

## ANNEX 5 - Table of Late:Early Territory Occupancy from 2008 to 2016

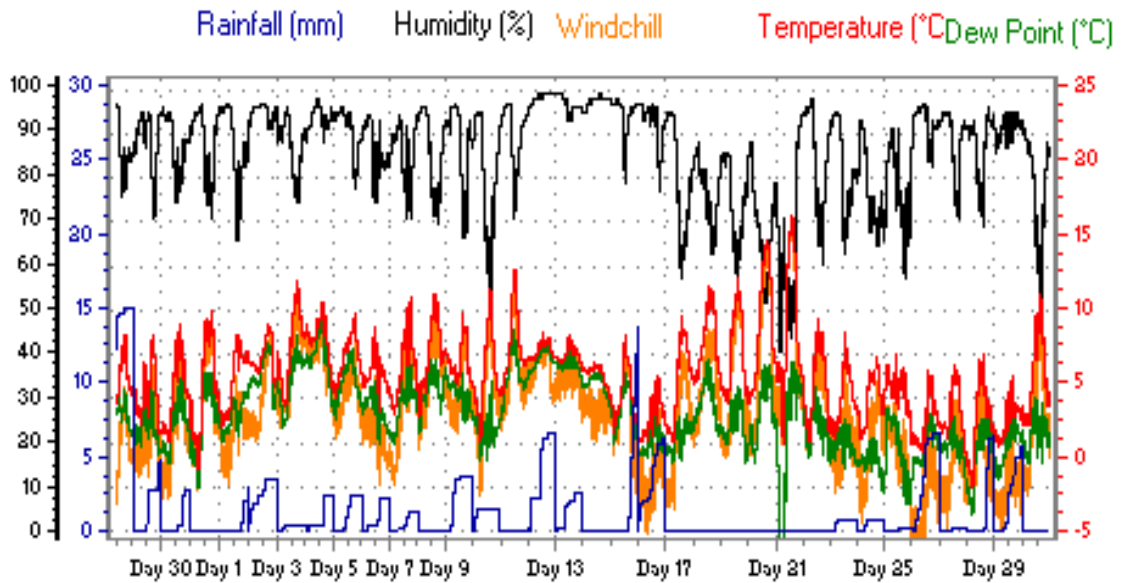
Table 1: Late and Early territory occupancy in the Rosedale area of the North York Moors between 2008 and 2016.

	2008		2009		2010		2011		2012		2013		2014		2015		2016	
	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late
Spindle Thorn		✓							✓		✓	✓		✓		✓		
Bank Top							✓		✓		✓		✓		✓	✓	✓	✓
Bank Top east															✓			
Hob Crag quarry	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	
Hob Crag north										✓	✓	✓			✓	✓		
Thorgill Bank quarry							✓	✓	✓		✓	✓	✓		✓		✓	
Thorgill Head													✓					
Thorgill Bank west																✓	✓	
Sheriff's Pit	✓			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Round Hill south	✓	✓	✓							✓		✓	✓				✓	✓
Round Hill east	✓	✓	✓	✓	✓		✓		✓			✓		✓		✓		
Round Hill west							✓		✓	✓	✓		✓	✓	✓			✓
Sledge Shoe			✓							✓	✓	✓	✓		✓	✓	✓	✓
Matty Carr south										✓					✓			
Matty Carr quarry	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	
Blakey Lion south										✓		✓		✓				
Blakey Lion north											✓							
Blakey Swang north	✓																	
Dalehead west			✓				✓	✓	✓		✓						✓	
Dalehead north	✓	✓			✓		✓			✓			✓					
Dalehead east								✓										
Dalehead quarry east					✓	✓					✓							
Dalehead quarry west						✓	✓	✓	✓							✓		✓
Reeking Gill cutting	✓				✓	✓			✓		✓							
Reeking Gill west													✓					
Reeking Gill	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Reeking Gill quarry	✓											✓	✓					
Reeking Gill south							✓				✓	✓	✓	✓				
Nab Scar north			✓		✓	✓	✓	✓		✓	✓	✓		✓	✓			
Nab Scar south					✓				✓				✓					
Sturdy Bank	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓			
<b>Total</b>	<b>11</b>	<b>6</b>	<b>8</b>	<b>5</b>	<b>11</b>	<b>7</b>	<b>13</b>	<b>10</b>	<b>16</b>	<b>9</b>	<b>18</b>	<b>12</b>	<b>19</b>	<b>7</b>	<b>15</b>	<b>6</b>	<b>11</b>	<b>6</b>
<b>Occupancy</b>	<b>0.54</b>		<b>0.62</b>		<b>0.64</b>		<b>0.77</b>		<b>0.56</b>		<b>0.67</b>		<b>0.37</b>		<b>0.40</b>		<b>0.54</b>	

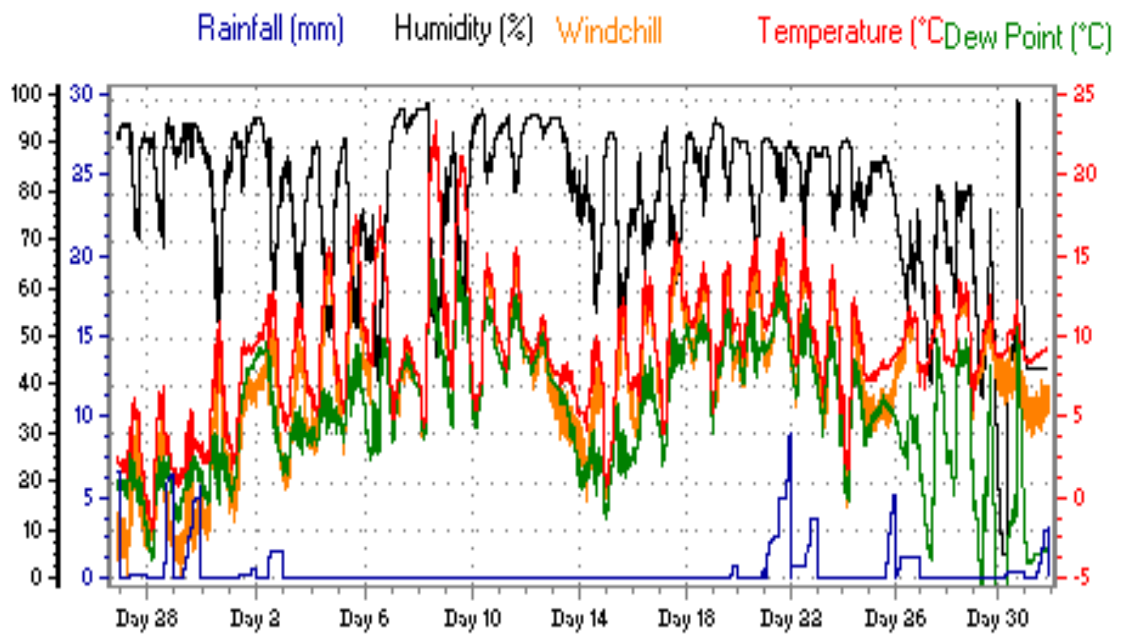
**ANNEX 6 - Graphs of Daily Temperature and Rainfall for the Months March to June 2016**



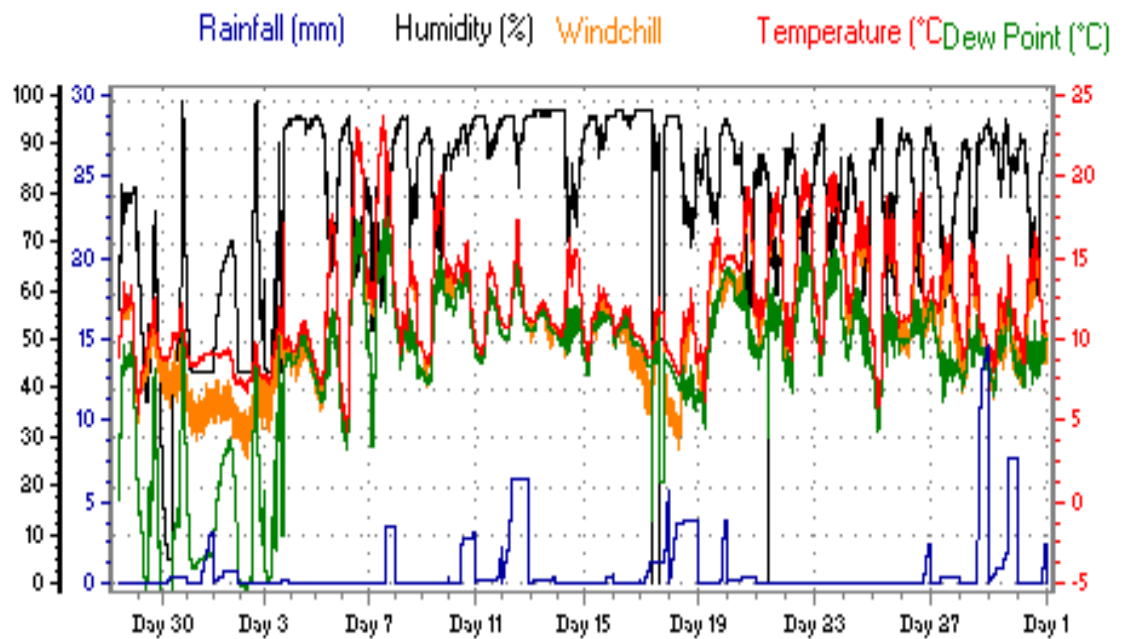
**March**



**April**



May



June

Daily max/min temperature & rainfall recorded at Westerdale, NZ665058, altitude 180m, in 2016.